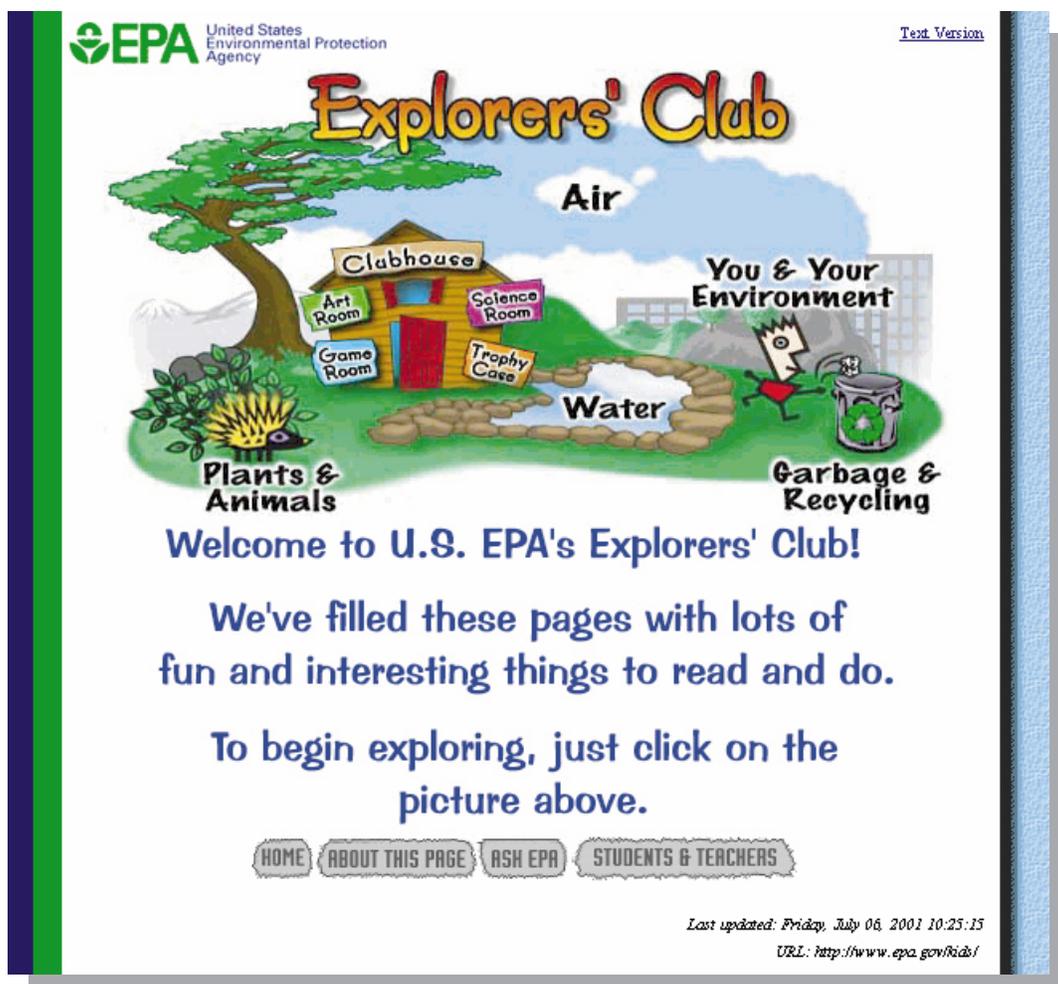


USABILITY ANALYSIS

of the

EPA Explorers' Club Web Site

<http://www.epa.gov/kids/>



 United States
Environmental Protection
Agency

[Text Version](#)

Explorers' Club

Air

Clubhouse

Art Room

Game Room

Science Room

Trophy Case

Water

You & Your Environment

Plants & Animals

Garbage & Recycling

Welcome to U.S. EPA's Explorers' Club!

We've filled these pages with lots of fun and interesting things to read and do.

To begin exploring, just click on the picture above.

[HOME](#) [ABOUT THIS PAGE](#) [ASK EPA](#) [STUDENTS & TEACHERS](#)

Last updated: Friday, July 06, 2001 10:25:15
URL: <http://www.epa.gov/kids/>

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Usability Analysis of the EPA *Explorers' Club* Web Site <http://www.epa.gov/kids/>

EXECUTIVE SUMMARY

This report evaluates the usability of the *Explorers' Club* Web site (www.epa.gov/kids/), an environmental education site for children ages 5 to 12, developed by the Environmental Protection Agency (EPA). The report presents the results of a combined effort by the EPA Office of Environmental Information (OEI), the EPA Access Workgroup, and Princeton Energy Resources International (PERI) to assess the *Explorers' Club* site, identify concerns or “trouble spots,” and present recommendations to help guide further development of the site so that it provides the information that the user wants through a system that is easy to understand, easy to remember, and subjectively pleasing. The OEI served as the lead office for this project.

The *Explorers' Club* site provides links to other EPA Web sites that contain games, coloring books, stories, and projects related to the environment. It is one of a trio of EPA environmental education Web sites, which also include the *Student Center*, for middle and high school students, and the *Environmental Education Center*, for teachers and other educators. All three sites are portals: they provide the structure and framework to enable users to locate age-appropriate Web sites covering a wide range of environmental topics. The EPA Access Workgroup is responsible for maintaining the three sites and has developed criteria for evaluating EPA and other environmental Web pages to determine if they are appropriate for inclusion in one or more of the portal sites. The Workgroup is a component of the EPA Environmental Education Advisory Board and includes environmental education coordinators and Web designers from several EPA headquarters and regional offices.

The approach for evaluating the usability of the EPA *Explorers' Club* involved the following three-step process:

- A *Primary Assessment*, or “expert review,” of the site, where an experienced Web site reviewer evaluated the *Explorers' Club* in terms of broadly accepted usability criteria, including the site’s accessibility, form and functionality, and content;
- A *User Test* evaluation, in which “typical” student users were observed as they completed a series of task questions and took part in a focus group discussion about the site. Two user test sessions were conducted. The first group comprised seven 3rd grade students at Thomas Jefferson Elementary School in Falls Church, Virginia, and the second group was

composed of seven 4th grade students at Jamestown Elementary School in Arlington, Virginia; and

- An *Analysis*, where the results of the primary assessment and user tests were synthesized and assessed, and recommendations for enhancing the *Explorers' Club* Web site were developed.

The EPA *Explorers' Club* provides access to a number of environmentally related stories, games, and activities in a colorfully designed and relatively easy to navigate site. The 3rd and 4th graders who tested the site liked it and seemed to enjoy the games, stories, and other features that they looked at. The 3rd graders expressed particular enthusiasm for the site during the focus group portion of the user testing, responding with a resounding “Yes!” when asked if they liked the site and if they would come back to it on their own. In addition, the students were quite successful in answering the task questions; on average, the test participants answered 83% of the questions correctly. Some of the positive comments made by the student participants during user testing include:

“It is fun to use.”

“It is easy to use.”

“I liked the games and stories.”

“Most sites were easy to use.”

“I liked the stories because the beginning captures the reader... you want to find out what happens next.”

“I'd come back for fun and for school reports.”

“I'd come back for games and useful information on how I can help the environment.”

Comments that suggested ways to improve the site included:

“Kids like music.”

“Music helps bring kids to a site.”

“Is there any sound?”

“It was hard to find definitions.”

“Use photos rather than drawings to show pollution, animals.”

“More graphics.”

“Want more words, more challenging sites.”

“Need better definition of Superfund.”

“Could use more facts and details.”

“More animation!”

“I want more bright colors.”

“Make the home page more colorful.”

“Why isn’t the ‘Back to *Explorers’ Club* button on every page?”

“Some of the words are blurry.”

“I want less words, more pictures!”

“I like to read, and I **like** the words!”

Nevertheless, expert review and user testing revealed a number of ways to improve the *Explorers’ Club* Web site. We reviewed the site according to nine distinct usability criteria and scored each of 50 key indicators of these criteria based on whether it is of “No or Limited Concern,” “Moderate Concern,” or “Major Concern.” Based on this analysis, we identified 12 areas of major concern, 19 areas of moderate concern, and 19 areas of no/limited concern. We then developed the following recommendations to address these concerns about the usability of the *Explorers’ Club* Web site:

Increase User Accessibility to the Site. This can be accomplished by registering with more commercial site engines and/or kids’ homework sites, marketing the site to schools and educational organizations, and ensuring that links to the site are included in other EPA sites for children.

Revise the Structure of the Home Page and Second-Tier Pages. A number of improvements can be made to the site structure that will enhance the site’s navigability as well as the visibility and understandability of the objects, actions, and options on the site. These include, for example, reorganizing the left side-bar, adding an “*Explorers’ Club* Home” button above the left side-bar, adding navigational links to the bottom of each page, and providing more visible links to the EPA *Student Center* and Environmental Education sites.

Improve Site Navigability. Improve the site map and create a simple search engine.

Improve Links.	Place links on bullet icons and review the site for bad links.
Clarify Terminology.	Define terms when they are used in the text and add a simple glossary of terms.
Improve Site Consistency and Standards.	Review the site periodically to ensure that all features are consistent and that none is missing. Ensure that linked sites are categorized appropriately.
Enhance Site Design.	Elementary school-aged users prefer the use of bright colors, graphics, sound, and similar features in Web sites. Consider adding more of these features to the <i>Explorers' Club</i> site.
Enhance User Control/Help.	Increase the visibility of the "Return to <i>Explorers' Club</i> " frame and remind users they can contact EPA for help.
Assess Accessibility to Disabled Users.	Ensure that all non-text features have alternative text markers. Review the site based on EPA guidelines for accessibility and using an accessibility software program.
Reassess the Purpose and Target Audience of the <i>Explorers' Club</i>.	The site currently seems most appropriate for kids on the lower end of the suggested age range. Evaluate the linked sites in relationship to the <i>Explorers' Club's</i> intended purpose and target audience to determine if the content is appropriate, too easy, or too difficult for the intended users.
Add Content.	Look for additional sites that provide more: environmental information; creative, challenging and interactive games; new features such as a scavenger hunt or an FAQ section; science experiments; hands-on activities; and information on ways kids can help protect the environment. Consider developing new pages if information is not currently available on existing sites.
Review the Site for Accuracy.	Periodically review the site for grammar and spelling errors and continue the on-going process of carefully evaluating sites before adding them to the <i>Explorers' Club</i> .

Perform Additional Usability Testing.

After the site has been revised, perform another round of usability testing. Test the site on student users at the low and high ends of the target audience age range (e.g., on 6 and 12 year olds). Work with EPA program offices and regional offices to assess the usability of some of the existing linked sites, as well as EPA Web sites that are potential candidates for future inclusion in the *Explorers' Club*.

1.0 BACKGROUND

The Environmental Protection Agency (EPA) has developed a series of three environmental education Web sites:

- *Explorers' Club* for children ages 5 to 12;
- *Student Center* for students in middle school and high school; and
- *Environmental Education Center* for teachers and other educators.

All three sites are portals: they provide the structure and framework to enable users to locate age-appropriate Web sites covering a wide range of environmental topics. The EPA Access Workgroup is responsible for maintaining the three sites and has developed criteria for evaluating EPA and other environmental Web pages to determine if they are appropriate for inclusion in one or more of the portal sites. The Workgroup is a component of the EPA Environmental Education Advisory Board and includes environmental education coordinators and Web designers from several EPA headquarters and regional offices.

This report evaluates the usability of the EPA *Explorers' Club* (www.epa.gov/kids/). It is one of three reports that present the results of a combined effort by the EPA Office of Environmental Information (OEI), which served as the lead office, the EPA Access Workgroup, and Princeton Energy Resources International (PERI) to assess the usability of the three Web sites, identify concerns or “trouble spots,” and help guide further development of the sites. Intended for children ages 5 through 12, the *Explorers' Club* provides links to EPA Web sites that contain games, coloring books, stories, and projects related to the environment.

2.0 APPROACH

The approach for evaluating the usability of the EPA *Explorers' Club* Web Site involved a three-step process. We first performed a Primary Assessment in which we evaluated the usability of the site in terms of its accessibility, form and functionality, and content. Next, we performed a User Test evaluation, where we assessed the success of respondents in using the *Explorers' Club*. Finally, we analyzed and synthesized the results of our primary assessment and user tests and developed recommendations for improving the *Explorers' Club* Web Site. This approach is described in more detail below.

2.1 Primary Assessment

The primary assessment involved an “expert review” of EPA’s *Explorers' Club* Web Site in terms of several usability principles. An experienced Web site reviewer evaluated the site according to its accessibility, seven major criteria related to its form and functionality, and to a more limited extent, the content of the portal site and its linked sites.¹ These usability criteria are described in Exhibit 1.

2.2 User Tests

The primary assessment results were used in conjunction with EPA input about goals and objectives for the site to create a tasking guide consisting of

Exhibit 1 – Primary Assessment Usability Criteria

Site Accessibility	The site should be quickly and easily accessible from commercial search engines and the EPA home page.
Form and Functionality	<p><u>Navigation and Visibility</u>: the site should always keep users informed about where they are and where they can go.</p> <p><u>Recognition Rather than Recall</u>: all objects, actions, and options on the site should be visible and broadly understandable.</p> <p><u>System/Real World Match</u>: the site should speak the user's language.</p> <p><u>Consistency and Standards</u>: users should not have to wonder whether different words, actions, or situations mean the same thing.</p> <p><u>Aesthetic and Minimalist Design</u>: the site should not contain information that is irrelevant or rarely needed.</p> <p><u>User Control and Help</u>: the site should help users recognize, diagnose, and recover from errors; help information should be succinct and easy to search.</p> <p><u>Accessibility to Disabled Users</u>: the site should be accessible to people with disabilities.</p>
Content	<p><u>Purpose/Target Audience</u>: the purpose of the site and the audience from whom the site is intended should be apparent.</p> <p><u>Coverage</u>: the breadth and depth of the site's content should be appropriate to the site's purpose and target audience.</p> <p><u>Accuracy</u>: the site should provide information that is accurate and free of errors.</p>

¹ Based on Jacob Nielsen’s ten usability heuristics and an extensive literature review of human factors research and web design. (See Keith Instone, “Usability Heuristics for the Web,” <http://webreview.com/WR/pub/97/10/10usabiity/sidebar.html>.)

an entry questionnaire, a set of task and focus group questions with observer notes, and an exit questionnaire (See Appendix 1). The guide was administered to seven 3rd grade students at Thomas Jefferson Elementary School in Falls Church, Virginia, and seven 4th grade students at Jamestown Elementary School in Arlington, Virginia. Because the 4th grade students were somewhat more advanced than their 3rd grade counterparts, the 3rd grade tasking guide was slightly revised for use with the older students: two of the six questions were replaced with more challenging tasks.

Exhibit 2 summarizes participant characteristics, based on their responses to the pre-test questionnaire. As shown in the exhibit, the 14 student test participants represent a range of Internet experience. While only one of the students perceived herself to be a beginner on the Internet, most of the 3rd graders described themselves as intermediate-level Web users. The seven 4th grade students are more evenly divided between intermediate and advanced levels of Internet experience. The amount of time the students use the Web reflects this difference in experience. All of the 4th graders reported using the Internet at least once a week, while four of the seven 3rd graders said they use the Web less than once a week. None of the 14 students had ever seen the *Explorers' Club* Web site before the test session.

Exhibit 2 – EPA Explorers' Club: Participant Characteristics

Characteristics		3rd Grade Students	4th Grade Students	All Students
Number of Students		7	7	14
WWW Experience	Beginner	1	0	1
	Intermediate	5	3	8
	Advanced	1	4	5
Frequency of WWW Use	Greater Than or Equal to Once/Day	2	4	6
	Less Than Once/Day	0	2	2
	Greater Than or Equal to Once/Week	1	1	2
	Less Than Once/Week	4	0	4
Typical Connection Speed	Slow	2	1	3
	Medium	0	1	1
	Fast	4	5	9
	Don't Know	1	0	1
Previous Use of Explorers' Club Site	Yes	0	0	0
	No	7	7	14

At each school, an observer worked individually with each student to complete the pre-test questionnaire. An EPA moderator then led the group of students through an elicitation process designed to evaluate the user's success in navigating the *Explorers' Club* Web site, and ensure that all users saw and experienced a certain number of similar aspects of the site. The

moderator first asked some focus group questions about the students' preferred methods of searching for environmental or other information. Next, the moderator asked the participants to complete six separate tasks to find specific information on the Web site. The moderator asked a series of final focus groups question seeking the students' overall impressions of the site. The session closed with a brief post-test questionnaire.

During the focus group and task questions, an EPA or PERI observer sat with each student, recording the participant's answers, the path used to locate the task answer, and any comments, frustrations, technical difficulties, or problems the participant experienced. Throughout the elicitation process, the moderator and observers encouraged the users to "talk out loud," expressing their opinions and perceptions as they surfed the site.

The entry and exit questionnaire responses, observers' notes, and participants' comments were summarized and evaluated based on the usability principles defined for the primary assessment. In addition, we assessed the *Explorers' Club* site in terms of the participants' success in completing their assigned search tasks, and the occurrence of any "catastrophic errors" during the elicitation process. These evaluation criteria are described in more detail in Exhibit 3. A copy of the tasking guide and a summary of the participants' responses are provided in Appendices 1 and 2, respectively.

2.3 Analysis

Based on the results of the "expert review" and user testing, we prepared a narrative evaluation describing how well EPA's *Explorers' Club* Web site meets each usability criterion and, for each criterion, scored relevant features of the site on a three-point scale (No/Limited Concern, Slight Concern, Major Concern). This analysis is presented below in Section 3.0, "Portal Site Results." A summary evaluation of the Web sites that are linked from the *Explorers' Club* is provided in Section 4.0. Procedures for improving the usability of the *Explorers' Club* were developed from these analyses (see Section 4.0, "Recommendations").

Exhibit 3 – User Test Evaluation Criteria

Usability Principles	Entry/exit questionnaires, observers' notes, and participants' comments as related to accessibility, form/functionality, and content criteria.
Task Completion	<p>Were the users able to successfully complete the requested tasks?</p> <p>How much searching was required to complete each task?</p> <p>Was tangential or excessive searching/clicking needed to complete tasks?</p> <p>Did the users become disoriented or lost?</p>
Catastrophic Errors	Did the users lose their Internet connection, get bumped off the site, lose interest due to length of time required to complete tasks or other reasons?

3.0 PORTAL SITE RESULTS

This section describes our findings regarding the site accessibility, form and functionality, and content of the EPA *Explorers' Club* Web site, based on analysis and synthesis of our primary assessment and user testing. A review scorecard that distills our findings and offers an easy benchmark for future assessments is also provided. This assessment focuses on the portal portion of the *Explorers' Club*.

3.1 Overview

The EPA *Explorers' Club* provides access to a number of environmentally related stories, games, and activities in a colorfully designed site. The 3rd and 4th graders who tested the site liked it and seemed to enjoy the games, stories, and other features that they looked at. The 3rd graders expressed particular enthusiasm for the site during the focus group portion of the user testing, responding with a resounding “Yes!” when asked if they liked the site and if they would come back to it on their own. The 4th grade students also agreed during the focus group session that they would return to the *Explorers' Club* site and that the site was easy and fun to use.

Nevertheless, both the student testers and the preliminary assessment revealed a number of ways the site could be improved. This section presents a brief overview of the user test results based on the test participants' general assessment of the *Explorers' Club* and their ability to complete the task questions. A more detailed analysis, based on usability principles, is presented in the subsequent sections.

Task Completion

Most of the 3rd and 4th graders had very little problem answering the task questions. On average, both groups of kids successfully answered five of their six task questions, or about 83 percent of the questions. The number of correct responses per participant ranged from two (one student) to six (five students) for the 3rd graders and from three correct responses (one student) to six (three students) for the 4th graders. Thus, in each test session, there was one student who experienced major problems finding his or her way around the site, while the remaining students were able to answer five or six of the six task questions.

The only question that posed a major problem was Task 5 of the 4th grade user test (“Look for a story about the Superfund. Can you find out how waste pollutants our waters?). The students were not familiar with the term “Superfund” and four of the six students could not identify the section that contained Superfund information. Several students went to the “Water” section rather than

“Garbage & Recycling” and found information about water pollution that was not specifically related to how waste pollutes our waters.

Technical and “Catastrophic” Errors

No catastrophic errors, resulting in loss of Internet connections, occurred during the user testing. A few technical problems did occur during the two test sessions, but none of these appeared to affect the success of the test participants. One test participant’s computer locked up during each test session (the computers were either restarted or the participant switched to a different computer). Occasionally a linked site would not load properly, so that the participant could not view the site. For example, the “Planet Protectors Club Coloring Book,” had a black screen which prevented one participant from coloring the picture, and “Hangman” (on the Global Warming Kids Page) did not download for one test participant. Other technical problems occurred in the “Detective Training Activities” site (accessed through the “Game Room”), where an advertisement appeared in the site and “PI in the Sky” does not work.

While most of the student participants were interested in answering the task questions and remained enthusiastic throughout the session, two of the third graders experienced some problems. One child was very quiet and found it hard to participate in the testing process; another child began to lose interest toward the end of the test session.

3.2 Site Accessibility

Students should be able to find the EPA *Explorers’ Club* when searching the Internet for environmental information for school projects or just for fun. We evaluated the accessibility of the site from commercial search engines and from the EPA home page.

Commercial Search Engines

PERI staff reviewed accessibility to the *Explorers’ Club* from five commercial search engines: Google, Yahoo, MSN, Lycos, and Monster Crawler.² For each search engine, twelve searches were performed using different key words and phrases commonly associated with EPA or environmental issues.

² These search engines were selected based on a combination of their overall frequency of use (see December 2000 Nielsen/Net Ratings (www.searchenginewatch.com/reports/netratings.html) and the “favorite” search engines used by the test participants of all three environmental education Web sites.

Exhibit 4 displays, for each key word or phrase, the number of search engines that returned a listing for the EPA *Explorers' Club* or for the EPA home page in the first twenty responses to a query.³ The terms “garbage” and “environment, kids” yielded a listing for the *Explorers' Club* from two of the five search engines. One search engine located the *Explorers' Club* when searching on the

terms “environmental information for students” and “recycling.” While all five search engines found the EPA home pages when the search term “EPA” was used, only three located the home page when searching on the term “environment” and only one search engine located the home page when we used the terms “environmental information for students,” “environmental education,” or “environmental information.” It should be noted that many of the search engine/search term combinations led to other EPA Web sites, such as the Office of Water home page or the Ozone Depletion site.

These results indicate that it is not likely that a user can quickly locate the EPA *Explorers' Club* by using a commercial search engine, unless s/he types in “EPA” or “environment” and then finds the *Explorers' Club* from the EPA home page. EPA has already taken some steps to enhance accessibility: the meta tags for the site include many typical search terms, including “air,” “water,” “garbage,” and “pollution,” and the titles and text on each page also include key environmental terms. Several other changes can be made to improve accessibility to the EPA *Explorers' Club*. For example, the

Exhibit 4 – Commercial Search Engines Listing EPA *Explorers' Club* and EPA Home Page by Search Criteria

Search Criteria	# Commercial Search Engines	
	<i>Explorers' Club</i>	EPA Home Page
Garbage	2	0
Environment, Kids	2	0
Environmental Information for Students	1	1
Recycling	1	0
EPA	0	5
Environment	0	3
Environmental Education	0	1
Environmental Information	0	1
Air Pollution	0	0
Ozone	0	0
Water Pollution	0	0
Environment, Student	0	0

* Based on evaluation of five search engines.

³ A search was considered successful if it resulted in a listing within the first 20 sites of the search results and brought the user to any page within the *Explorers' Club* site. It was not considered successful if the link brought the user to the EPA *Student Center* or *Environmental Education Center*.

Explorers' Club should be listed with as many commercial search engines as possible. It might also be possible to contact some of the kids' homework pages (e.g., the Ask Jeeves site, www.AJKids.com) to see how to link the *Explorers' Club* to these sites. Also, EPA might increase awareness of the *Explorers' Club* and EPA home page by marketing them (through mailings, announcements, etc.) to teachers, teacher associations, schools, students, and environmental education organizations. Another way to increase accessibility is to work with the Web masters of other regional and headquarters EPA sites, as well as other federal, state, local, and non-governmental environmental sites, to include links to the *Explorers' Club* on these sites.

EPA Home Page

The *Explorers' Club* Web site is easily accessible from the EPA home page. When asked to find the EPA *Explorers' Club* from the EPA home page, all but one of the 3rd and 4th grade students found the *Explorers' Club* by clicking on the colorful "Kids" icon on the left side-bar. While most found the icon immediately, three students scrolled through the site before noticing the button. A couple students commented that the "Kids" link was too far down on their computer screens, requiring them to scroll down to find it.

3.3 Form/Functionality

This section assesses the *Explorers' Club* based on the seven usability criteria for judging the form and functionality of a Web site, and on the results of both the preliminary assessment and user testing.

Navigation and Visibility

A Web site should be constructed so that the user is always informed about where s/he is and where s/he can go within the site. It is important to provide the user with: 1) a clear overview of the site's content and structure; and 2) easy methods to find whatever information s/he is looking for.

As evidenced by their success in completing the task questions, most of the test participants found the *Explorers' Club* site relatively easy to navigate. In their post-test questionnaire, most of the 3rd graders said they usually knew where

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-----From Administrator Whitman's Six Month Progress Report

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Administrator Whitman visited New York City's South Bronx to promote clean air technology for urban neighborhoods.

Whitman Issues Draft Decision to Dredge Hudson River
EPA is moving forward on a decision to clean up an estimated 1.1 million pounds of polychlorinated biphenyl (PCB) pollution in the Hudson River.

Environmental Progress Report
Administrator Whitman released a report on significant EPA accomplishments protecting health and the environment.

EPA Estimates Costs of Clean Water Program
Implementing one of the key tools to clean up the nation's waters could cost between \$900 million and \$4.3 billion. EPA is requesting comments on a draft cost study about the Total Maximum Daily Load (TMDL) program.

Green Diesel Engine Technology Meets EPA Rule for Cleaner Diesel Trucks and Buses
EPA recognized the certification of International Truck and Engine Corporation for its Green Diesel Engine Technology. The company has demonstrated that it is possible to meet federal heavy-duty diesel particulate emission standards well before the 2007 deadline.

they were (five of seven respondents), that it was easy to find interesting information (five of six respondents), and that it was easy to find information on the home page most or all of the time (five of seven respondents). The 4th graders agreed during the focus group discussion that the site is easy to use. Despite these favorable comments, the user testing and expert review suggest several improvements that could enhance the site's navigability and visibility.

Provide a site overview. As described above, it is important to provide an overview of a site's content and structure to give users an initial understanding of the site's purpose and how the site works, and to serve as a reference. However, a detailed site overview is probably less important in a site for children than for older users, since children are less likely to take the time to read about a site's purpose and content.

The *Explorers' Club* does contain an "About This Page" section, which describes the site's purpose, links to information about how to download PDF and shockwave files, and provides a link to the site index. The site description is simple, short, and seems appropriate to the age of the site's users. The section should be renamed "About *Explorers' Club*" (or possibly "About This Site"). This is a more accurate description, is consistent with the actual section title, and will alleviate any confusion over whether the section provides information specific to each page in the site or to the entire *Explorers' Club* site.

Provide a site map or index. A site map or index helps the user understand the site's content and structure. It is particularly helpful to users who do not like to "click through" a site's pages to find information.

While the *Explorers' Club* index provides an alphabetical listing of linked sites contained in the *Explorers' Club*, several changes could be made to improve this feature. First, the format should be revised to make the index more useful. A more visually-oriented site map may be easier for kids to use than an alphabetical index of linked site titles. One main reason for not using an index is that the titles of the linked sites do not provide a clear indication of the specific topics covered in the sites. In addition, a site map format provides a better overview of the site's structure so the user can understand what is in the site and how to find it. The site map should display all linked sites (the current index lists only nine of the total 21 linked sites) plus all other site features (e.g., "About the *Explorers' Club*," "Ask EPA"). It should also show the "EPA *Explorers' Club*" banner and the section title ("Site Map") at the top of the page.

Currently the site map is accessible only through the "About This Page" section. It should be made more prominent by creating a "Site Map" button at the bottom of the home page and on the left side-bar of each subsequent page.

Provide a search engine. A search engine is another useful means for locating desired information. Although the *Explorers' Club* does not contain a search engine, it is interesting to note that several of the 3rd grade test participants did use search engines on the linked sites (this information was not collected for the 4th grade participants). Since young children know how to use search engines, a simple search engine should be added to the *Explorers' Club*. To ensure that the search function is visible to users, a search box should be added to the home page and links to the search engine should be provided at the bottom of each page. Suggestions on how to format search results are provided in the companion reports for the EPA *Student Center* and *Environmental Education Center* Web sites.

Provide Links to Home and Other Pages. Another way to enhance navigability and visibility is to provide clearly marked links to the site's home page and other main pages, so the user can always find his or her way back to these pages easily and without scrolling.

The *Explorers' Club* site provides user access to the home page and other pages in the site through the use of a home button at the bottom of each page and by repeating the five subject topics and four clubhouse topics on the left side-bar of every page. Nevertheless, improvements to the site links would further enhance navigability and visibility:

- Create "*Explorers' Club* Home" and "EPA Home" links to replace the generic "Home" button that currently appears at the bottom of each page. The "Home" button at the bottom of the *Explorers' Club* home page takes the user to the EPA home page, while an identical button at the bottom of subsequent pages links back to the *Explorers' Club* home page. This is confusing to the user, since "home" means something different on different pages in the site. (A link to the EPA Office of Environmental Education home page can also be included, if desired.)
- Revise the bottom links to include the following: Site Map, About the *Explorers' Club*, Ask EPA, Search, *Explorers' Club* Home, and EPA Home. These links may need to be put on smaller buttons, placed in brackets [], or be separated by lines.
- Add an "*Explorers' Club*" Home" button to the top of each page just above the left side-bar. This will enable the user to return to the home page from any page in the *Explorers' Club* without scrolling to the bottom of the page to find the home button. While many of the pages in the *Explorers' Club* are short enough that the user can view the entire page (including the bottom link to "home") on the screen, this function should be added in anticipation of an expanded *Explorers' Club* Web site.

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- Make the EPA logo (on the top of each page) a link to the EPA home page and the “*Explorers’ Club*” banner a link to the *Explorers’ Club* home page. This provides the user another way to return to EPA and the *Explorers’ Club* home pages without creating additional clutter on the pages.
 - Revise the left side-bar on all pages of the site (except the home page). The side-bar will be easier to understand and more attractive if the environmental subject buttons (i.e., “Air,” “Water,” “Garbage & Recycling,” “Plants & Animals,” and “You & Your Environment”) are separated from the clubhouse buttons (i.e., “Art Room,” “Game Room,” “Science Room,” “Trophy Case”). If there is room, each group could be given its own heading (i.e., “Environmental Topics” and “Clubhouse Topics”) so that the user clearly understands the difference between each group. Construct the left side-bar buttons so that the button for the page that is being viewed is highlighted. This will enable the user to quickly see which section s/he is in. Links to the “About the *Explorers’ Club*” and “Site Map” should be added to the top of the left side-bar so that these feature can be seen without scrolling to the bottom of the page. A link to the EPA *Student Center* and, if desired, the *Environmental Education Center* for teachers, should be added at the bottom of the left side-bar (see “Recognition and Recall” below for additional discussion of these last two links.)

Include a banner heading, main heading, and sub-headings on every page.

Each page of a Web site should identify the site name (e.g., “*Explorers’ Club*” or “EPA *Explorers’ Club*”), and any appropriate headings or sub-headings (e.g., “Plants & Animals”). This enhances both site navigation and site consistency by ensuring the user will always be informed of exactly where s/he is within the site. The *Explorers’ Club* Web site follows this format very consistently, with the one exception being the “Index” page, which does not contain a heading labeled “Site Index.”

Avoid the Need to Scroll. Many users do not like to scroll up and down the page to find information. While the test participants did not complain about excessive scrolling on the *Explorers’ Club* pages, several participants did complain that they had to scroll on some of the linked sites, particularly when playing certain games. As one child put it, “Having to scroll is no good! You need to put key information above the fold.” This suggests that scrolling should also be kept to a minimum on the *Explorers’ Club* site itself. Users must scroll to the bottom of each *Explorers’ Club* page in order to get back to home or to certain other sections of the site (i.e., “About this Page,” “Ask EPA,”). As described above, placing an *Explorers’ Club* home button on the top left corner of each page, and adding links to the “About this Page,” “Ask EPA” on the left side-bar will alleviate the need to scroll up and down.

As linked sites are added to the *Explorers' Club*, it will become necessary to reorganize the site structure so that users do not have to scroll through long lists of links to find something of interest. This can be accomplished in several ways, depending on the type of linked sites that are added to the *Explorers' Club*. For example, each main topic heading (e.g., “Water,” “Air,” “Art Room”) can be subdivided into several sub-topics. The sub-topic headings would be listed as links directly under the appropriate main heading. The user could click on a link to get to the subsection further down the page, which lists all the sites related to that sub-topic. As the *Explorers' Club* site expands in size, each sub-topic should be placed on a separate, tertiary-level page.

The most obvious way to define sub-topics selected for each major topic would be based on subject. For example, the “Air” heading could be divided into categories such as indoor air quality, outdoor air quality, global warming, etc. A different approach would be to divide each topic according to type of linked site (e.g., game, story, coloring book, etc.)

Review for Broken, Incorrect, Slow, and Orphaned Links. Web sites should be periodically reviewed for broken, incorrect, slow, and orphaned links. The preliminary assessment and user test revealed only one bad link - to the Pollution Drawing Gallery, which is accessed through the “Water” section of the *Explorers' Club*.

Recognition Rather than Recall

All the objects, actions, and options on a Web site should be highly visible and broadly understandable so that users can refer to them as guides without needing to remember what they mean. There are a number of ways to construct sites to ensure that the user can easily locate and understand the meaning of every site feature. These are described below.

Ensure that all buttons, labels and other options are easily visible and the purpose of each button and label is clear.

The version of the *Explorers' Club* that was reviewed for this report contained a small link to the “Children’s Health Page” in the upper right-hand corner of the home page. This link appears to have been deleted from the most recently updated version of the site (July 6, 2001). The link was in very small font, and difficult to spot on the home page. If it is brought back to the site, it should be placed in an appropriate section of the site (e.g., “You and Your Environment”).

The purpose of the “Students and Teachers” button at the bottom of each page is also a bit unclear and not highly visible. The *Explorers' Club* site is intended for kids aged 5 through 12. This represents a wide variation in cognitive abilities

and learning style, and it is likely that older kids using the site may find that it is too “childish” or does not contain detailed enough information. Consequently, it is important for older kids who use the *Explorers’ Club* Web site to realize that the companion “*Student Center*” Web site provides more substantial information. The “Students and Teachers” button does not make this fact very clear. A more visible and understandable approach would be to add a link to the “EPA *Student Center*” on a button, star burst, or other graphic below the left side-bar. A mouse-over description of the site would enable the user to quickly determine if s/he wanted to go to this site.

The site that the “Students and Teachers” button links to, which contains pictures of each of the three environmental education Web sites, is also confusing. When the user goes to this site, it is not clear that s/he has left the *Explorers’ Club* and the introductory paragraph seems redundant. Furthermore, the site lacks a “Return to *Explorers’ Club*” frame, is too large for the computer screen, and does not print out in its entirety.

The test participants made several suggestions for improving the clarity and visibility of buttons and other options on the *Explorers’ Club* site. For example, some of the students tried to click on the decorative icons rather than the site titles listed in the secondary page (e.g., garbage pail icons are used in the “Garbage & Recycling” section). Making these icons clickable would help those users who intuitively click on the picture rather than the site title.

Several participants successfully downloaded sites that are available as PDF files (e.g., “Follow that Trail” in the “Planet Protectors Club” site) but then became confused and frustrated because they assumed it was an interactive game and could not figure out how to play it. This points out the need to clearly label links to PDF files so the user understands that these files are not interactive, but are meant solely to be read and/or printed. This is not easy in the case of “Follow That Trail” because it is located on a site that is outside the *Explorers’ Club*, but the description for “Planet Protectors Club” and other sites that contain PDF files should explain that the site(s) contain PDF files that are only for reading or printing.

Finally, while most of the participants knew that the pictures and labels on the *Explorers’ Club* home page are links, this was not immediately intuitive to some of the kids. They suggested that the labels be underlined, and possibly put in a blue font, so that it is clear that they are links to information.

Select text colors, background colors, and font types/sizes that are legible and functional.

The young participants noticed when fonts were too small or blurry. For example, some of the test participants commented that the print size used for the “Clubhouse” topics on the *Explorers’ Club* home page is too small to read easily. They suggested that a larger font size be used. The participants also commented that the font was slightly out of focus and too small in the linked site, “Save Our Species” (accessible through the “Plants & Animals” section).

It is interesting to note that while the colors and fonts used in the *Explorers’ Club* site are typically both legible and functional, the test participants wanted to see brighter, more interesting colors in the site. This is discussed below in the “Aesthetics and Minimalist Design” section.

Use words, rather than graphics, as labels. The *Explorers’ Club* Web site relies on words, rather than graphics, as labels. When graphics are used they are always accompanied by labels, so that the user does not have to interpret the meaning of a picture. While graphics should typically be avoided unless they serve a purpose, some of the younger student participants expressed an interest in seeing more pictures, photos, and other graphics to illustrate site functions. This issue is discussed below in the “Aesthetics and Minimalist Design” section.

Provide multiple access points to information, but not so many as to clutter the site. As described in the previous section, adding top and bottom home buttons, creating links on the EPA logo and *Explorers’ Club* banner, and revising the left side-bar will give the user many ways to access the information in the site without adding clutter.

System/Real World Match

Another principle fundamental to a well-designed Web site is that the information presented in the site should be written clearly in language that is familiar to the site’s users. Technical terms and jargon should be avoided, and all terms and metadata in tables should be clearly defined.

The *Explorers’ Club* site is well-written, avoids technical jargon and, for the most part, the page and site descriptions are concise, clear, and appropriate for elementary school students. In some cases, however, the definitions of key terms were not clear to the test participants. They questioned the meaning of the terms “ozone,” and “global warming,” for example. “Where is a definition of ozone?” wondered one 4th grader while reading about ozone on one site. The 4th grade students encountered difficulties when asked to find a story about Superfund and to explain how waste pollutes our waters. Part of their problem

was they did not know what Superfund is and so could not find the appropriate topic in the *Explorers' Club* site.

These problems can be minimized in several ways. First, terms should be defined when they are used in the introduction to a section or in the description to a linked site. Second, a simple glossary of terms should be added to the *Explorers' Club* site. This may need to be developed specifically for the site, since the EPA "Terms of the Environment" dictionary is too complex for elementary school students. Finally, technical terms that are used in the main body of the *Explorers' Club* site can be linked to their definitions in the glossary.

Consistency and Standards

The language, actions, and situations in a Web site should be consistent so that their meanings are clear to the user.

One important element of Web site consistency is to adopt consistent design features and interface elements from page to page. Several design and format revisions have been suggested in other sections of this report (see, in particular, "Navigability and Visibility", and "Recognition and Recall"). Once these changes are made, the entire site should be reviewed to ensure that all features, headings, and titles are consistent across the site. One inconsistent feature, revealed from the expert review, involves the icons used as bullets in each section where linked sites are listed. In the "Art Room" section, two paint brush graphics are used for each linked site, as compared to all the other sections which use one icon per linked site.

The site should also be periodically reviewed and updated to ensure that all features are complete. For example, the Index to the *Explorers' Club* Web site only lists a portion of the linked sites that are in the *Explorers' Club*, and certain pages in the *Explorers' Club* site are missing bottom links (see, for example, the "Air" and "You & Your Environment" pages). In addition, several linked sites do not have the "Return to *Explorers' Club*" frame on one or more of their pages. For example, "Animals and Plants in the Chesapeake Bay" (in the "Plants & Animals" section), "What You Need to Know About Mercury" (in the "You & Your Environment" section), "Darby Duck" (in the "Science Room"), and "A Kid's Adventure Story" (in the Garbage & Recycling section) are missing frames on some or all of their pages. "Waste No Words" in the Garbage & Recycling section has a frame that takes the user to the EPA *Student Center* instead of the *Explorers' Club*.

Consistent naming protocols should be used in the Web sites so that the user never has to wonder whether different words mean the same thing. For example, in the *Explorers' Club* site: "Water Treatment Path" is referred to as

“Water Treatment Process” in the “Water” and “Science Room” sections of the site; “Happy Earth Day Coloring and Activity Book” is referred to as the “Happy Earth Day Activity Book” in the “Art Room” and other locations; “A Kid’s Adventure Story: Learning About Superfund” is simply referred to as “A Kid’s Adventure Story” in the “Garbage & Recycling” section and “Science Room.” By dropping the word “Coloring” from the “Happy Earth Day Coloring and Activity Book” or “Superfund” from “A Kid’s Adventure Story” the user loses key information about the site.

It would be useful to review the site to ensure that the linked sites are assigned to all appropriate sections of the *Explorers’ Club*. For example, “Darby Duck and the Aquatic Crusaders” is listed in the “Science Room,” but not in the “Water” section. “When Greenville Turned Brown” is in the “Art Room” even though it does not involve coloring or drawing pictures.

There are not many “formal” Internet standards that all Web sites adhere to, but the *Explorers’ Club* does conform to those few that do exist. The *Explorers’ Club* follows the Internet conventions of using blue for links to pages that have not been viewed by the user and red or purple for pages that have been seen. In addition, the site follows the practice of linking on the name of a Web site, publication, or conference, rather than on a generic description of that item.

Aesthetic and Minimalist Design

A good web site should have aesthetic appeal and a crisp design that is unhampered by moving images, overwhelming colors, or irrelevant information and features.

The *Explorers’ Club* Web site is attractive, colorful, and uncluttered. Nevertheless, the student test participants were unanimous in their request for more color, graphics, pictures, photographs, cartoon pictures, animation, and moving features. While many of the kids’ suggestions can probably be implemented without adding irrelevant features or resulting in a garish Web site, care does need to be taken to ensure that any redesign remains aesthetically pleasing and is not distracting. The test participants’ suggestions are described below.

Use more color. Most of the student participants thought the home page and rest of the site should be more colorful. Specifically: 1) brighter colors should be used throughout the site; 2) brighter colors (not just black and blue) should be used for lettering, with the exception of links; 3) page titles and headings should be in color rather than white; and 4) page backgrounds should be in color rather than white. They also identified linked sites (such as “What’s Wrong With This Picture?” in the “Water” section) that would benefit from additional color.

Add graphics, photos, and pictures. The students would like to see a greater use of graphics, photographs, and cartoon pictures in the *Explorers' Club* Web site. They indicated that photographs illustrating environmental issues (e.g., photos of polluted sites or endangered species) would be useful for school reports. They preferred interesting graphics and cartoon pictures for their own fun and enjoyment, and complained when one linked site's black and white drawings were hard to interpret (see the stream erosion picture in "What's Wrong With This Picture?"). While some additional graphics can be added to the main pages of the *Explorers' Club* Web site, it is also important to note that the use of interesting graphics might be one criterion in selecting sites for the *Explorers' Club*.

Consider adding animation and moving pictures. Animation and other moving features are not recommended for sites used by adults because the moving objects can be very distracting to users. The elementary school test participants, however, were enthusiastic in their request for animation, and several participants particularly liked the floating letters used in the Global Warming Kid's Site. They suggested using animation to illustrate site functions or environmental concepts. For example, one student recommended adding an animated picture of a person picking up trash and placing it in the trash barrel to illustrate the "Garbage & Recycling" page. While animation is generally not recommended, it might be possible to add a small animated feature to the home page or use animation to illustrate the main topic of each subsequent page. In addition, the inclusion of animation might be a consideration when selecting sites to add to the *Explorers' Club*.

Consider adding sound/music. Several student participants also suggested adding music and/or sounds to both the *Explorers' Club* site and linked sites. As two students pointed out: "Kids like music;" "Music would help bring kids to the site and keep them there longer."

User Control and Help

A Web site should assist the user in recognizing, diagnosing, and recovering from errors, and should provide succinct help information. One way to provide user control is to provide a means for the user to ask for help. The "Ask EPA" section of the *Explorers' Club* allows the user to send an e-mail to EPA to make suggestions or ask questions about the agency or the environment. This section could be rewritten to let the user know that s/he can also contact EPA if s/he has questions about how to use the site.

Because the EPA *Explorers' Club* is a portal site, most of the links are to EPA sites outside the Center. This situation can potentially confuse users if they do not realize that they have left the *Explorers' Club* and then cannot find their

way back to the site. The EPA *Explorers' Club* contains a feature to help users find their way back to the Center - a "Click Here to Return to the *Explorers' Club*" frame at the bottom of most of the EPA web sites. The student participants did not usually experience difficulties returning to the *Explorers' Club* home page after visiting a different EPA site, and most participants got back to the home page by clicking the back button. Nevertheless, those students who discovered the "Return to the *Explorers' Club*" frame did use it, and one participant wondered why the frame was not present on all pages. The students recommended making the frame more visible by either creating a larger frame or moving it to the top of the page. It might also be helpful to add a "remove frame" option so that the user can delete the frame from a particular site if s/he finds it annoying.

Accessibility to Disabled Users

Web sites should be accessible to people with disabilities, including those who are blind, color blind, deaf, or have cognitive disabilities.

This report summarizes the findings of a cursory review of the *Explorers' Club* in order to identify the most obvious ways by which the site can be made more accessible. A more complete assessment should be made by reviewing the EPA Web site on accessibility (see Section 508 Guidelines at <http://Intranet/Accessibility/>). An accessibility software program such as "Bobby" (www.cast.org/bobby) can also be used to identify ways to make the site more accessible to disabled users. A quick review of the *Explorers' Club* using Bobby did identify missing alternative text, possible color contrast issues, and other potential accessibility problems in the site.

The most common method of ensuring that a site is accessible to visually impaired users is to provide alternative text markers to describe all images, graphical buttons, image maps, and other non-text features on the site. While most images appear to have alternative text, some alternative text tags are missing or are tagged "image map navigation." (See, for example, the *Explorers' Club* banner, main topic headings, and bottom buttons on the home page.) In addition to adding alternative text where it is missing, all alternative text should be checked to ensure that extended descriptions are provided in cases where an image conveys information beyond what is in its alternative text (see, for example, the introductory paragraph to "About the *Explorers' Club*").

Another way to provide accessibility to visually impaired users is to create text-only pages for the site. While there is a "text version" link on the home page of the *Explorers' Club*, it brings the user to the site index, not a text version of the site. If a text version is desired, it should provide a complete text alternative to all pages of the *Explorers' Club* and should be updated whenever the site is

updated. If it is not desired, the link should be deleted. In either case, alternative text markers should be used.

Certain colors and color combinations are difficult for color-blind users to differentiate. The *Explorers' Club* should be assessed to determine if the lettering is visible to color-blind users (for example, the grey on grey coloring in the links at the bottom of each page). In addition, color coding should not be used to convey information on a web site. This does not appear to occur in the *Explorers' Club*. Any changes made to colors in the site should be reviewed for possible visibility problems.

Finally, Web sites should avoid distracting elements by minimizing the use of moving, blinking, scrolling, or auto-updating objects or pages and/or ensuring that these features can be paused or stopped. As described in previous sections of this report, the *Explorers' Club* does not contain this type of distracting feature.

3.4 Content

The 4th and 5th grade students who reviewed the *Explorers' Club* Web site were enthusiastic about the site contents. They specifically mentioned liking the games, stories, and coloring book features on the site. One student said he particularly liked the stories because “the beginning captures the reader and you want to find what happens next.” The students also appreciated the educational elements of the site, and often provided examples of sites where additional information would be helpful.

While a Web site's content can be evaluated according to a number of criteria, the following discussion focuses on those criteria that reveal the main potential for site revisions: the purpose, target audience, coverage, and accuracy of the site.

Purpose and Target Audience

The purpose of the site should be clearly described and located in a highly visible location, and the target audience for the site should be apparent. The purpose of the *Explorers' Club* Web site is described in the “About the Page” section of the site (i.e., “Get ready to explore your environment and learn about the neat things you can do to protect it. There are games, pictures, and stories and other fun things.”) While this is an appropriate statement of purpose for the young users of the site, the home page itself does not provide a clear description of the fact that the *Explorers' Club* site provides environmental information. The written description of the site that appears on the home page should be revised to indicate that the “fun and interesting things to read and do” are all related to the environment.

The site's intended target audience (ages 5 to 12) is clear from both the home page and the "About This Page" section. The information in the site seemed very appropriate for the 3rd and 4th grade test participants (typically ages 8 to 10), based on their interest in the site and ability to answer the task questions, and many of the linked sites also seem appropriate for younger children (e.g., ages 5 to 8). While the site also contains information that is geared towards older elementary students, more mature 11 and 12 year olds may find the home page design and the emphasis on games and pictures to be a bit juvenile for their taste.

Coverage

The breadth and depth of the information provided in a Web site should be appropriate to the site's purpose and target audience. The purpose of the *Explorers' Club* (as stated in the "About the Page" section) suggests that the site's main goal is to encourage learning about the environment through fun activities and games, rather than to provide a complete academic learning center for elementary school-aged kids. If so, the site is probably most appropriate for the younger end of the intended age range (e.g., ages 5 to 10). In this case, it is very important to make the link to the EPA *Student Center* very visible and its purpose clear, so the older and/or more mature students can find their way to that site for more academic information. On the other hand, if the site is intended to be an environmental learning center for kids, many more informational sites (as opposed to game sites) are needed, and each topic page (e.g., "Air," "Water,") should be organized by sub-topic to facilitate finding information by subject area.

The *Explorers' Club* Web site is the smallest of the three environmental education sites, and several sections of the site are not highly populated. The results of the preliminary assessment and user testing suggest several ways to expand the contents of the *Explorers' Club* Web site. The specific types of sites selected for the *Explorers' Club* will depend to a large extent on the EPA's intended purpose and target audience of the site, as described above.

Add informational sites. Perhaps the most interesting and dynamic discussion during the user testing occurred when the 3rd grade students were asked if the *Explorers' Club* site contains enough written information. A lively debate ensued over whether the site should have "more pictures" or "more words." One student, who had carefully read through each site she visited and had answered the task questions easily, stated that she likes to read and would definitely like to see more words, facts, and information on the site. Other students said they don't like to read a lot of information and prefer games and pictures ("less words, more interactive tools and pictures!") The students recommended several good compromises. One participant suggested that there

should be both more words AND more pictures. Another student likes to read short facts and suggested adding sites that contain pictures with captions that describe each picture. Other students recommended providing short descriptions about a topic and allowing users to click on a link to get more detailed information about the subject.

By contrast, the 4th grade students agreed that there are not too many words in the *Explorers' Club* Web site. In fact, they wanted to see more detailed information in many of the sites that they visited, and asked for “more words, more facts, and more challenging games.”

Improve and Add Games. The 3rd and 4th grade test participants enjoyed the games they played on the *Explorers' Club* Web site. The 3rd graders favorite games were “What’s Wrong With This Picture?,” “Word Search,” “Hangman,” and “Checkers.” (The 4th graders did not list their favorite games.)

Despite their enthusiasm for the games, the test participants made many suggestions for improving the games they played and for developing new games. Some responded that they learned about the environment in many of the games they played. For example, one 3rd grader said that with the game “Concentration,” “you learn through pictures what is helping and hurting the environment.” In “What’s Wrong With This Picture?” she said, it “looked as if nothing was wrong and then you’d learn what was bad.”

Nevertheless, other students (especially the 4th graders) thought the games should have stronger links to environmental issues. They also wanted the games to be more interactive, have clearer instructions, include interesting moving features, and be more challenging. Some of the suggestions for games they would like to see include:

- A “Checkers” or “Tic-Tac-Toe” game where the player would have to correctly answer a question about the environment in order to move his or her piece. The game pieces could be trees or some other environmental design.
- An environmental hangman game. One 4th grader described a game (“Save the Earth”) designed by his father, where a picture of the earth is used in place of the gallows, and a chunk of the earth is devoured each time the player selects the wrong letter (see www.clayberg.com). Students also suggested providing an environmental clue for each word used in the Hangman game.
- A maze game where a car that is leaking oil has to find its way to the mechanic.

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- A coloring game about the environment where the player must color in the environmentally sound activities or objects shown in the picture and circle what is polluted.
 - Environmental “trivia” or guessing games where the player types in answers to questions about the environment.
 - A game where the player tries to beat an oil company.
 - A spaceship game.
 - An obstacle course game.
 - Problem-solving games, guessing games, and interactive games.

Add New Features. The students suggested ideas for new types of features or sites that could be added to the *Explorers’ Club*. These include, for example,:

- A “Frequently Asked Questions” (FAQ) section.
- A worksheet or set of questions that the user could answer as s/he progresses through the *Explorers’ Club* Web site. This could be presented as a scavenger hunt.
- Additional information on how kids can help improve the environment. This could be a new section containing sites that give kids ideas on how to help the environment.

Expand Existing Sections. While most of the sections of the *Explorers’ Club* Web site contain a small number of linked sites and should be expanded, the user test participants specifically suggested adding more sites to the Art Room and Trophy Room, and more hands-on experiments to the Science Room. Their recommendations for experiments, which included how to make “Gak” and exploding volcanoes, suggests that they are particularly interested in experiments that combine learning with fun and messy activities. The 4th graders liked the science experiments that they looked at on the *Explorers’ Club*, but did not mention the Science Room as one of their favorite sections of the site. They did acknowledge that information on science experiments would be useful for school projects or homework. Since many elementary schools require their students to participate in science fairs, it would be very helpful to expand the Science section to include many more sites that describe age-appropriate science experiments that teach about the environment.

Search other EPA Web Sites for Additional Linked Sites. Close to one-half of the linked sites on the *Explorers’ Club* Web site are EPA Office of Solid Waste and Emergency Response (OSWER) Web sites. This suggests that a

review of all headquarters and regional EPA kids sites might identify other EPA sites that could be added to the *Explorers' Club*. For example, EPA Regions 1 and 7 have children's Web sites that may be appropriate for the *Explorers' Club*. In addition, the EPA Environmental Education site for teachers may contain activity sites that could also be included in the *Explorers' Club* site.

Accuracy

A Web site should provide information that is accurate and free of both substantive and grammatical/spelling errors. The accuracy of the linked sites is tracked by the Access Workgroup, which follows an established system for evaluating potential sites. The portal portion of the *Explorers' Club* appears to provide information that is substantively accurate and appropriate for its users.

The *Explorers' Club* should also be reviewed periodically for misspellings, grammatical errors, and format issues. The preliminary assessment revealed some minor mistakes. For example, in the You & Your Environment/ABCs of Superfund description, replace the word "using" with "the" to avoid repeating the word "use" in one sentence; in the introduction to the Science Room, "everyday" should be changed to "every day;" in Trophy Case, change "kids that" to "kids who."

3.5 Summary

Exhibit 5 combines all the usability criteria and scores the key indicators of each criterion according to whether it is of "No/Limited Concern," "Moderate Concern," or "Major Concern."

Exhibit 5 – Evaluation: Usability Do’s and Don’ts

Usability Criteria/Do’s and Don’ts	No or Limited Concern	Moderate Concern	Major Concern
Site Accessibility			
Do: Link Site to Many Key Words and Phrases	✓		
List Site With Kids’ Homework Pages			✓
Register with Commercial Site Engines			✓
Create Visible Links from Other Sites			✓
Publicize Site			✓
Make Site Accessible from EPA Home Page	✓		
Form and Functionality			
Navigability			
Do: Provide a Site Overview		✓	
Provide a Site Map			✓
Provide a Search Engine		✓	
Identify and Link Back to Home			✓
Provide Headings on Every Page		✓	
Check for Broken, Incorrect, and Orphan Links		✓	
Don’t: Make People Scroll		✓	
Recognition Rather Than Recall			
Do: Make Options Visible		✓	
Use Clear, Legible Color Combinations and Font Sizes		✓	
Make Each Button’s Purpose Clear		✓	
Use Pop-Up Descriptions/Mouse-Overs Where Appropriate	✓		
Provide Multiple Access Points to Information		✓	
Don’t: Use Graphics as Labels	✓		
System/Real World Match			
Do: Define Technical Terms		✓	
Provide a Glossary of Terms			✓
Define Terms/Metadata in Tables	✓		
Don’t: Use Technical Jargon	✓		
Consistency and Standards			
Do: Adopt Consistent Design Features/Interface Elements		✓	
Use Consistent Terminology and Labels	✓		
Classify Information Consistently and Correctly		✓	

Exhibit 5 – Evaluation: Usability Do’s and Don’ts (continued)

Usability Criteria/Do’s and Don’ts	No or Limited Concern	Moderate Concern	Major Concern
Consistency and Standards (continued)			
Do: Use Consistent Naming Protocols		✓	
Use Standard Colors for Links	✓		
Use Publication Titles for Links	✓		
Don’t: Forget to Update			✓
Aesthetic and Minimalist Design			
Do: Provide an Age-Appropriate Design		✓	
Ensure Pages Print Out Legibly		✓	
Don’t: Clutter Page with Too Many Links	✓		
Use Frames	✓		
Use Moving Images	✓		
Include Irrelevant Information	✓		
Use Overwhelming Colors	✓		
User Control and Help			
Do: Provide Contact Information	✓		
Use Exit Markers at Links That Go Off-Site	✓		
Provide a Means for Users to Return to Site		✓	
Accessibility to Disabled Users			
Do: Provide Alternative Text Markers		✓	
Update Text Pages			✓
Use Color Combinations That Color-Blind Users Can Detect		✓	
Review Site for Accessibility			✓
Don’t: Use Color Coding	✓		
Use Distracting Elements	✓		
Content			
Do: Describe the Site's Purpose and Target Audience			✓
Provide Appropriate Breadth and Depth of Information			✓
Provide Accurate Information	✓		
Review for Grammar and Spelling Errors		✓	
All Criteria	19	19	12

4.0 ANALYSIS OF LINKED SITES

While the main objective of this usability analysis is to review the portal portions of the *Explorers' Club* and develop recommendations for improving these sections of the site, it is also important to assess the linked sites. It was impossible to conduct an analysis of all 21 sites that can be accessed through the *Explorers' Club*. Nevertheless, the student participants did comment on twelve sites that they had the opportunity to visit during the user testing sessions. Their comments are summarized in Exhibit 6.

As indicated by their comments, the students had favorable impressions of ten of the twelve sites they visited. They seemed particularly enthusiastic about “A Kid’s Adventure Story” and the Global Warming kids’ site, and also enjoyed “When Greenville Turned Brown,” “Save Our Species,” “What’s Wrong With This Picture?” and “Recycle City.” On the other hand, they also had complaints and/or offered constructive criticism about most of the twelve sites, including, for example, “Planet Protectors’ Club, the Global Warming kids’ site, “Save Our Species,” “On the Trail of the Missing Ozone,” and “What’s Wrong With This Picture?”

For at least seven of the sites (marked with an asterisk in Exhibit 6), the students’ negative comments suggest the need for further usability analysis to identify ways to improve the structure, functionality, and/or content of the sites. Because the success of the *Explorers' Club* is dependant on the usability and content of the linked sites, it is also important to assess the usability of any additional sites being considered for inclusion in the *Explorers' Club*.

Exhibit 6 – Explorers’ Club Linked Sites: Test Participants’ Comments

Linked Site Name	EPA Office/ Other Agency	Site Location	Number of Participants Who Commented	Comments
A Kid’s Adventure Story	OSWER	Science Room	11	<ul style="list-style-type: none"> • Graphics are good. • It teaches about garbage and recycling. • Would like music to accompany the site. • Like the "pointing finger" buttons that signal to turn the page. • Like the cartoon pictures and animation. • Like the story because the beginning captures the reader and you want to find out what happens next." • Like the story - it was "pretty neat and kind of funny." • The experiment is easy to understand. • The site is easy to use. • Like the "so what did we learn?" section at the end of the experiment. • Confused about the concept of Superfund. • Would tell family and friends about the site. • Experiment has good instructions.
Animals and Plants of the Chesapeake Bay*	Chesapeake Bay Program	Plants & Animals	2	<ul style="list-style-type: none"> • It could use more games. • Has a lot of information that would be useful for homework, but wouldn't go there on my own. • Liked this site better than Save our Species because it has more colors, is more kid friendly, and has more information and pictures. • Needs more animated pictures instead of "real" pictures.
Darby Duck and the Aquatic Crusaders	Office of Water/OWOW	Science Room	7	<ul style="list-style-type: none"> • Site is easy to use. • Instructions are easy • None of the experiments looked interesting - would like different kinds of experiments, but don't know what. • Like the experiment with colors and want to try it at home. • Like putting food color in things. • Like the explanation of the oil and water experiment - it describes why it happens. • Add more water under Darby Duck. • Particularly liked "Sink or Swim." • It looks neat. • It is kid friendly.
Global Warming*	OAR/ Office of Atmospheric Programs	Air You & Your Environment	14	<ul style="list-style-type: none"> • Overall site - seemed pretty easy to understand. • Overall site - it was easy and explained what global warming is. • Overall site - liked the trailing (e.g., "floating") words on main page. • Overall site - the icon to get to the games is confusing. It should be separate from the other icon, and the mouse over text shouldn't switch. • Overall site - would go back on own some time. • Overall site - it looks cool, it's the best site so far. • Overall site - liked the games on the site. • Hangman - player should get clues at start of game to help figure out the environmental term. • Hangman - needs directions. Not clear how to play it. • Hangman - couldn't get the game to start. • Hangman - it's okay. • Hangman - it's pretty fun (then went to try Concentration). • Word Search - needs more challenges, more words. • Word Search - don't like to have to scroll to see entire game. • Word Search - didn't have any problem circling the words. • Word Search - liked the feature where the word is automatically erased once it is found. • Word Search - doesn't teach much about global warming. Wanted to know definition of the "greenhouse effect" but couldn't find it. • Checkers - had trouble getting the game to start. • Checkers - make the checkers board black and white. • Checkers - add sound when one player "jumps" another. • Checkers - doesn't teach much about global warming - "it's just checkers" • Concentration - need more and clearer directions. • Concentration - don't like to scroll to see entire game. • Concentration - liked it better than checkers. • Concentration - learned through the pictures what activities help and hurt the environment.

*Sites where students' comments indicate possible need for further usability assessment.

Exhibit 6 – Explorers’ Club Linked Sites: Test Participants’ Comments (Continued)

Linked Site Name	EPA Office/ Other Agency	Site Location	Number of Participants Who Commented	Comments
On the Trail of the Missing Ozone*	OAR/ Stratospheric Protection Division	Air Science Room	1	<ul style="list-style-type: none"> • Add color to the Ozone comics. • Had trouble starting the story. • Had trouble pronouncing some of the words.
Planet Protectors Club*	OSWER	Garbage & Recycling Art Room	3	<ul style="list-style-type: none"> • Needs a description for each game, so the user can choose the ones that look most interesting. • Not interested in looking at "Case of the Broken Loop." • Thought "Environauts" looked interesting but need more information on how to play. • "Follow That Trail" is confusing. (The reason for the confusion was that the game is a PDF version, and the student was trying to play it interactively.) • "Follow That Trail" needs less reading and more interactive activities - couldn't draw a circle on the page (Again, this is because it is a PDF file.) • "Follow That Trail" does teach about the environment. • "Follow That Trail" - would return to the site on his own. • "Follow That Trail" - would like more graphics. • "Coloring Book" - didn't work. The picture was black and the instructions got in the way of the picture. • "Detective Training" - an ad appeared on the screen.
Recycle City	EPA Region 4	Garbage & Recycling You & Your Environment Game Room	2	<ul style="list-style-type: none"> • It's cool...It's great!" • It teaches about how you should reuse and recycle. • Would return to the site. • Might return to the site.
Save our Species*	OPPTS	Plants & Animals Science Room	10	<ul style="list-style-type: none"> • It is interesting and at grade level (4th grade). • It was interesting because it is about animals. • It is useful and interesting to learn about the disappearance of plant and animal species. • The font should be a little bigger and clearer. The pages are hard to read. • Liked the pictures of animals. Could use them for reports. • Needs more animation. • Needs more information on each species, including scientific names and information about the juvenile of each species. • It is interesting and easy to understand. • It is pretty neat, but would like more detailed information. • Needs some games and activities in addition to the facts. • Add the name underneath the picture of each plant and animal. • Too much clicking was needed to read the tags for each picture. • Might go back to see some of the animals, but wouldn't go back a lot (this student got bored with the site and then checked out the Chesapeake Bay site). • Would go back - it would be good for a report.
The ABCs of Superfund*	OSWER	Garbage & Recycling You & Your Environment	2	<ul style="list-style-type: none"> • It's for younger kids (from a 4th grader). • Why is "B" for bulldozer? What does this have to do with the environment?
Water Treatment Path	Office of Water/Office of Ground Water and Drinking Water	Water Science Room	1	<ul style="list-style-type: none"> • It is easy to understand. • Like the flow of the water path.
What's Wrong With This Picture?*	Office of Water/OWOW	Water You & Your Environment Game Room	7	<ul style="list-style-type: none"> • Learned about the environment and what activities can pollute the environment. • It is pretty fun. • It is good. • It has good information. • It was fun to look for things in the house that were done wrong. • Would like the site to be in color. • I'd like more animated pictures. • The picture of stream erosion was not clear. Student could not visualize the environmental problem. • Concerned and confused about the picture that is intended to show that we should not water pavement when watering plants. This point was not clear.
When Greenville Turned Brown	OSWER	Garbage & Recycling You & Your Environment Art Room	2	<ul style="list-style-type: none"> • Like pictures and animation. • Like stories because the "beginning captures the reader and you want to find out what happens next." • Suggest adding a "moral" to the end of the story.

*Sites where students' comments indicate possible need for further usability assessment.

5.0 RECOMMENDATIONS

A summary of recommendations for improving the usability of the EPA *Explorers' Club*, based on the preceding analysis, is provided below.

5.1 Increase Site Accessibility

- a. Register the *Explorers' Club* with as many commercial search engines as possible.
- b. Contact children's homework sites to investigate the possibility of providing links to the *Explorers' Club* from these sites.
- c. Market the *Explorers' Club* to teachers, teacher associations, schools, and environmental education organizations.
- d. Ask Web masters of other regional and headquarters EPA Web sites to include links to the *Explorers' Club* site.

5.2 Revise Home Page and Second-Tier Page Structures

- a. Revisions to Home Page Only
 - i. Enlarge font size of "Clubhouse" labels (e.g., "Science Room").
 - ii. Revise wording on home page to state that all the "fun and interesting things to do" are related to the environment.
 - iii. Consider underlining the section labels (e.g., "Plants & Animals") on the home page to make it more clear that these are links.
- b. Revisions to Second-Tier and Subsequent Pages Only (See Exhibit 7)
 - i. Revise the left side-bar by separating the main topics from the Clubhouse topics
 - ii. Revise left side-bar so that the side-bar button for the page that is being viewed is highlighted.
 - iii. Add "About the *Explorers' Club*" and "Site Map" above the left side-bar.
 - iv. As more linked sites are added to the *Explorers' Club* create sub-headings for each main topic. The sub-headings can link to a related sub-section further down the page (or on a tertiary-level page). Sub-

Exhibit 7 – U.S. EPA Explorers' Club Sample Page Layout



Banner:

Explorers' Club

Heading:

Water

Left Side-Bar:



[Explorers' Club Home](#)

[About Explorers' Club](#)

[Site Map](#)

[Dictionary](#)

[Environmental Topics](#)

[Air](#)

[Water](#)

[Garbage & Recycling](#)

[Plants & Animals](#)

[You & Your Environment](#)

[Clubhouse Topics](#)

[Art Room](#)

[Game Room](#)

[Science Rooms](#)

[Trophy Case](#)

[EPA Student Site](#)

[EPA Teachers Site](#)

[About Explorers' Club](#) | [Search](#) | [Site Map](#) | [Ask EPA](#)
[Explorers' Club Home](#) | [EPA Home](#)

headings can be categorized by topic (e.g. the “Air” topic can be divided into “Indoor Air Quality,” “Global Warming” and other sub-topics) or possibly even type of site (e.g., games, stories, coloring books, etc.)

- v. Descriptions of linked sites should alert the user if they contain PDF files and explain that these files are intended solely to be read and/or printed out.
- c. Revisions to All Pages
- i. Create “*Explorers’ Club* Home” and “EPA Home” links to replace the generic “Home” button on the bottom of each page.
 - ii. Revise the bottom links to include: “Site Map”, “About the *Explorers’ Club*,” “Ask EPA,” “Search,” “*Explorers’ Club* Home,” and “EPA Home.” These links may need to be placed on smaller buttons or separated by brackets [] or lines.
 - iii. Add an “*Explorers’ Club* Home” button to the top of each page, just above the left side-bar.
 - iv. Make the EPA and *Explorers’ Club* logos on top of each page, links to the appropriate home pages.
 - v. Add links to the EPA *Student Center* and, if desired, the EPA *Environmental Education Center*, on the lower corner of the home page and below the left side-bar on subsequent pages. Put these on buttons or some type of graphic so they are visible. Consider adding mouse-over text to describe these sites.

5.3 Improve Site Navigability

- a. Expand and revise the Site Map format. (See Exhibit 8).
- b. Rename “About this Page” section “About *Explorers’ Club*” or “About this Site.”
- c. Create a simple search engine and add a search box to the home page.

5.4 Improve Links

- a. Review the *Explorers’ Club* site on a regular basis for broken, bad, slow, and orphaned links (software programs are available for this purpose).

Exhibit 8 – U.S. EPA Explorers' Club Sample Site Map



Banner:
Heading:
LEFT SIDE_BAR

**Explorers' Club
Site Map**



Environmental Topics

Air

Global Warming
On the Trail of the Missing Ozone

Water

Pollution Drawing Gallery
Water Treatment Process
What's Wrong with this Picture?
ETC.

Clubhouse Topics

Art Room

ETC.

Other Topics

About Explorers' Club
Acrobat PDF Files
Site Map
Shockwave

Ask EPA
Make a suggestion
Ask a question

Glossary

EPA Student Center
EPA Environmental Education Center

-
- b. When bulleted lists of sites are provided, place the link on both the bullet and the site name.
 - c. Link directly to the EPA *Student Center* Web site and the EPA Environmental Education Web site without going through an interim environmental education Web site page.

5.5 Clarify Terminology

- a. Provide a simple definition of environmental terms when they are used in the introduction to a section or in the description to a link.
- b. Provide a simple glossary of terms.
- c. Consider linking technical terms that are used in the site to their definition in the glossary.

5.6 Improve Site Consistency and Standards

- a. After revisions are made to the site structure, review the entire site to ensure that all features, headings, titles, and bottom links are consistent across the site and that none is missing.
- b. Update the site map each time a new site is added to the *Explorers' Club*.
- c. Check all pages of all linked sites to ensure they contain the "Return to *Explorers' Club*" frame.
- d. Review the names of linked sites to ensure that they are referred to the same way each time they are listed in the *Explorers' Club*.
- e. Review the site to ensure that linked sites are assigned to the appropriate sections of the *Explorers' Club*. For example, "Darby Duck and the Aquatic Crusaders" should be listed in the "Water" section as well as the "Science Room."

5.7 Enhance Site Design

- a. Use brighter colors for lettering, page titles and headings, and/or page backgrounds.
- b. Consider adding more graphics to the site, if it does not clutter up the site.

-
- c. Consider selectively adding animation and moving pictures to illustrate site functions and/or environmental concepts.
 - d. Consider adding sound and music to the site.
 - e. When selecting sites to link to the *Explorers' Club*, keep in mind that kids like sites that contain graphics, cartoon figures, photos, pictures, animation, sound, and music.

5.8 Enhance User Control/Help

- a. Increase the visibility of the “Return to *Explorers' Club*” frame by either increasing its size or possibly moving it to the top of the page.
- b. In the “Ask EPA” section, remind the user that s/he can contact EPA for information on how to use the site.

5.9 Assess Accessibility to Disabled Users

- a. Review the site to ensure it is in accordance with EPA’s guidelines for accessibility (see Section 508 Guidelines at <http://Intranet/Accessibility/>).
- b. Review the site using an accessibility software program, such as Bobby (www.cast.org/bobby) to identify ways to make the *Explorers' Club* more accessible to disabled users.
- c. Review site to ensure all non-text features have alternative text associated with them.
- d. Either delete the text version of the site (and rely on alternative text) or update the text version so that it covers the entire site.
- e. Review the color combinations used in the *Explorers' Club* site (particularly the grey on grey combination used for the bottom links) to ensure they are visible to color blind and visually impaired users.

5.10 Evaluate the Purpose and Target Audience of the *Explorers' Club*

- a. Revise the description of the *Explorers' Club* site that appears on the home page to specify that it provides “fun and interesting things to read and do” that relate to the environment.
- b. Reassess the intended purpose and target audience for the *Explorers' Club*. The suggestions and recommendations provided in this report are based on

the assumption that the main purpose of the *Explorers' Club* is as a site that teaches kids about the environment through games, stories, and other fun activities. In this case, children on the older end of the age 5 through 12 target audience range may find the site to be too young for them. If, the site is intended to be an academic learning center for elementary school students, it could be more appropriate for these older pre-teens if many more age-appropriate informational sites are added. Decisions pertaining to the selection of additional sites to be linked to the *Explorers' Club* and the site's organizational structure and artistic design depend, in large part, on the site's specific purpose and target audience.

5.11 Add Content

- a. Add informational sites. Most of the sites in the *Explorers' Club* provide games, pictures, stories, etc. that provide a little environmental information with a lot of fun. More sites that provide facts and detailed information about environmental topics should be added for those students who need information and pictures for school reports or who just enjoy reading about the environment.
- b. Add more games, stories, and coloring book sites.
- c. Look for games that teach more about the environment and are interactive, challenging, creative, and have clear instructions.
- d. Add new features.
 - i. Consider adding a "scavenger hunt" type worksheet with questions that users can answer as they look through the site.
 - ii. A "Frequently Asked Questions" section might also be interesting and instructional for the student users.
 - iii. Students are also interested in information describing specific ways they can help protect the environment.
- e. Expand existing sections of the *Explorers' Club* Web site.
 - i. Review the entire site to determine which sections are most in need of expansion (e.g., the Air, Water, and Plants & Animals Sections and the Art Room, Trophy Room, and Science Room).
 - ii. Add more science experiments that can be used for science fair projects and hands-on science activities.

-
- f. Review all headquarters and regional EPA Web sites for kids' sites that can be linked to the *Explorers' Club* site.

5.12 Review Site for Accuracy

- a. Periodically review the *Explorers' Club* site for grammar and spelling errors.
- b. Continue the existing system for evaluating sites before adding them to the *Explorers' Club*, to ensure accurate and appropriate content.

5.13 Perform Additional Usability Testing

- a. After the *Explorers' Club* Web site has been revised, perform a second round of usability testing on kids at the lower and higher ends of the target audience age range (e.g., ages six and 12). This will reveal information on how well the site revisions have met the usability needs of the users as well as providing additional information on how well the site meets the needs of its youngest and oldest users.
- b. Work with program and regional EPA offices to perform expert review and user testing of many of the linked sites in the *Explorers' Club*, as well as other EPA Web sites that are potential candidates for inclusion in the *Explorers' Club*. The results can be assessed in conjunction with the Access

APPENDIX 1

**EPA *EXPLORERS' CLUB*
USER TEST FORMS**

June 15, 2001

Date _____ Time _____ Participant Name _____

**EPA Explorers' Club Web site Usability Test
Participant *Entry* Questionnaire**

1. *What grade are you in?*
_____ (please specify)

2. *Please describe your level of experience using World Wide Web:*
 beginner intermediate advanced

3. *On average, how often do you use the World Wide Web (not including e-mail)?*
 less than once a week once a day
 less than once a day more than once a day

4. *How would you describe the connection speed you typically have to the Web?*
 slow fast _____ what kind of connection do you have?

5. *Have you ever use the EPA Student Center Web site?*
 yes no

6. *What are three things you would expect to find on a site called EPA Student Center?*

Date _____ Time _____ Participant Name _____ (optional)

EPA Explorers' Club Web Site Usability Test
Participant Post-test Questionnaire

1. *Were the task questions you completed the type of information you would come to the EPA Explorers' Club Web site to look for?*

_____ Yes _____ No

2. *Did you use the search tool?*

_____ Yes _____ No

3. *Why would you come back to the EPA Explorers' Club Web site?*

_____ Nothing at all, would not return

4. *When I was performing a task I:*

_____ Felt Lost _____ Felt I knew where I was

5. *After performing the test how easy or difficult do you think it would be for you to find information that interest you on the EPA Explorers' Club Web site?*

_____ Easy to Find _____ Difficult to Find

6. *The Home-Page was structured in a way that made it easy to find information:*

_____ All of the time _____ Most of the Time _____ Some of the Time _____ Never

7. *Did the Information flow logically on the Web site:*

_____ All of the time _____ Most of the Time _____ Some of the Time _____ Never

8. *I would like the EPA Explorers' Club Web site to have:*

OBSERVER NOTES

Web Site: EPA Explorers' Club Web Site

Grades 3 and 4

Date: June 6, 2001

Observer Name: _____

Observer Phone Number: _____

Observer E-mail _____

Participants Name: _____

Browser Used : Netscape or Explorer

It is absolutely necessary that you do not offer any comments or assistance unless necessary.

If you are having a problem or your participant is having a problem please flag down the moderator.

Focus Group Question 1.

Focus Group. How many of you use the Internet to look for information to help you with your homework?

The moderator will ask the participant to tell you the search engine.

--If so, what type of information have you looked for??

-- Have you ever looked for information about the environment? --What topics did you look up?

--How did you (or would you) begin your Internet search?

--What search engines did you (or would you) use?

--What search terms did you (would you) use?

Verbal Comments:

Focus Group Question 2.

Please type www.epa.gov into the address bar. This takes you to the home page for the Environmental Protection Agency. *(Note: the follow-up questions can be asked by the observers instead of the moderator, depending on how well the first focus group question works!)*

--Can you find the EPA kids' site from here?

--If not, can you think of ways EPA could make it easier for kids to find the site?

Verbal Comments:

TASK 1

Can you find a site about garbage and recycling?

--What site did you find?

Take a minute to look at the site or play the game that you found:

--Do you like this site?

--Does it teach you something about garbage and/or recycling?

--Would you go to this site on your own some time?

Path/Destination URL/Answer:

1. www.epa.gov/kids/garbage.htm
2. "Garbage & Recycling" page of the Explorers' Club
3. Participant can select any site on this page.

Please check off the following behaviors of the participant & note other behaviors, which may not be included in this list.

User Comments/Attitude

Annoyed Frustrated Confusion Effortless
 "BACK" Button use "STOP" Button use Search Too use False Start

Graphics (comments made):

Disappointment (comments made):

Technical Difficulties

Broken Link Long-wait for pages to load
 Page did not load Other Web Site Errors : _____

Task competed _____ Yes _____ No

TASK 2

Find a site that tells you about plants and animals

Note to Observer: *If the participant goes to “Animals and Plants in the Chesapeake Bay” direct him/her to find another site about plants and animals.*

- Can you find the beetle?*
- Do you like this site?*
- Does it contain interesting information?*
- Would you go to this site on your own some time?.*

Path/Destination URL/Answer:

www.epa.gov/kids/savespecies.htm

“Plants & Animals” page of the Explorer’s Club

“Save Our Species” Web site

Click on the picture of the beetle

TASK 3

Find a site that describes science experiments.

- Can you find a specific science experiment that would be fun?*
- What experiment did you choose?*
- Is the site easy or hard to use?*
- Are the instructions for the experiment easy to understand or are they too complicated?*
- What do you like about this experiment?*
- If nothing looks interesting, what don’t you like about the experiments?*
- What topics or types of experiments would you like to find in this section?*
- Would you go to this site on your own some time?*

Path/Destination URL/Answer:

www.epa.gov/kids/science.htm

“Science Room” page of the Explorer’s Club

Participant can select any site that contains science experiments (“Darby Duck and the Aquatic Crusaders” or “A Kid’s Adventure Story”)

TASK 4 (3rd Grade Students)

Can you find information about air pollution?

Once the student locates the Air page of the Explorers' Club, ask: Now, do you think you can find a game about global warming?

- What game did you choose?*
- Does the game look like fun?*
- Will the game teach you about global warming?*
- Does the Global Warming kids' site look interesting?*
- Would you go to this site on your own some time?*

Path/Destination URL/Answer:

www.epa.gov/kids/globalwarming.htm
“Air” page of the Explorer’s Club
“Global Warming” Web site
Click on “Games”
Select any game

TASK 4 (4th Grade Students)

What is the meaning of the term “global warming”? Please find a site about global warming and tell us your comments about the site.

Path/Destination URL/Answer:

www.epa.gov/kids/globalwarming.htm
“Air” page of the Explorer’s Club
“Global Warming” Web site

TASK 5 (3rd Grade Students)

Can you find a site that describes how we pollute the water around us?

- What site did you choose?*
- Do you like this site?*
- Is it easy to understand how to use the site?*
- Does it contain interesting and helpful information?*
- Would you go to this site on your own sometime?*

Path/Destination URL/Answer:

www.epa.gov/kids/whatswrong.htm

“Water” or “You and Your Environment” or “Game Room” page of Explorers’ Club
“What’s Wrong with this Picture?” Web site

TASK 5 (4th Grade Students)

Look for a story about Superfund and find out how waste pollutes our water.

“Garbage and Recycling”
“A Kids Adventure Story”

TASK 6

Find an environmental game that you would like to play.

Path/Destination URL/Answer:

--What game did you select?

Give the participant a minute to play the game.

- Did you enjoy the game?*
 - Why or why not?*
 - What suggestions do you have for improving the game or what types of games would you rather play on this site?*
 - Would you go to this site on your own some time?*
-

Focus Group/Observer Follow-up.

Now that you've had a chance to look at more of the Explorers' Club site, we'd like to know what you think about the site. The adult sitting with you will ask you a few questions about how you liked the Explorers' Club.

–Would you come back to the Explorers' Club on your own?

–Why or why not?

–Is the Explorers' Club fun to use?

–Is it easy to use?

--Did you usually feel as if you knew where you were in the site or did you feel lost a lot of the time?

--Does the Explorer's Club contain interesting information?

--Do you like the design and the colors that are used?

–Were there enough graphics?

--Are the descriptions of each site that you can go to within the Explorers' Club easy to understand?

–Do they give you a good idea of what each site will contain?

--Do you like the games and activities that you saw? Why or why not?

--Would you make any changes to the Explorers' Club to make it better? If so, what would you change?

APPENDIX 2

**EPA *EXPLORERS' CLUB*
USER TEST RESULTS**

Summary of Focus Group and User Test Results
EPA Explorers' Club Web Site
Thomas Jefferson Elementary School, Falls Church, VA (3rd Grade)

Task/Data	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Pre-Test Questions							
Grade	3 rd	3rd	3rd	3rd	3rd	3rd	3rd
WWW Experience	Intermediate	Beginner (she reported herself to have intermediate experience, but her work indicated beginner level)	Intermediate	Advanced (Dad teachers Internet/computer)	Intermediate	Intermediate (observer's assessment)	Intermediate
Freq. Of Use	<once/week	< once/week	>once/week	>once/day	<once/week	< once/week	>once/day
Connect Speed	slow	Fast	Fast (sort of)	Slow (old computer at home) Fast (new home laptop)	Fast	Fast	
Used Student Center Site?	No	No	No	No	No	No	No
What would you expect to find on site?	Did not ask this question	Not sure		1. Menu of other Web sites for kids 2. Information about schools, other places, and the environment.	3. How to do a good job to protect the environment. 4. Recycling 5. How to save trees 6. How to stop extinction in plants.		

Task/Data	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Post-Test Questions							
Were the task questions type of info you'd look for?	Yes	NR	NR	Yes	NR		Yes
Use Search Tool?	No	Yes	Yes	Yes (once)	No		No
Would you return to this site? What info would bring you back to site?	Yes	Yes, for games and reports	NR	Yes, for fun and for school		Yes	Yes, for fun.
How did you feel when perform-ing a task?	Knew where I was	Felt lost most of the time.	Knew where I was	Knew where I was.	Felt lost.	Knew where I was.	Knew where I was.
Would it be easy or difficult to find info that interests you on the site?	Easy	Difficult	Easy	Easy	Easy	Easy	NR
It was easy to find info on home page:	Most of the time	Some of the time.	Most of the time	Most of the time.	All of the time.	All of the time.	Some of the time.
Info flowed logically:	Most of the time	Never	All of the time.	Most of the time.	Some of the time.	All of the time.	Some of the time.

Task/Data	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
I'd like the site to have:			NR		NR		<p>Observer's comments based on observing the participant:</p> <ol style="list-style-type: none"> 7. Larger print for the Science Clubhouse. The small print made it hard for participant to spot. 8. Clickable icons. (The icons on each page are not links.) 9. Keep key information on top of page so don't have to scroll down. "Having to scroll to right to center item of interest is a problem."

Task/Data	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Focus Group Questions							
Browser	Netscape	Netscape	Explorer	Netscape	Netscape	Netscape	Not reported
1. If you use the Internet, what information have you looked for?	<ul style="list-style-type: none"> Look for different things, use for book reports. 	Not present	<ul style="list-style-type: none"> Games Facts for school reports. 			<ul style="list-style-type: none"> For fun, gamers.com (learned about it from friends) joecartoon.com (really likes this one) 	<ul style="list-style-type: none"> Mostly at home Look for sites that she hears about on t.v. Nickelodeon noggin.com
Have you looked for information about the environment?			No, but will in the future.				No.
How did you begin your Internet search?			Type in the subject of interest.				
What search terms would you use?			The subject word.. When doing homework, would type in "epa."	<ul style="list-style-type: none"> "Book report" Report topic Person's name. Sometime searches for interesting topics (e.g., ponies, or things heard about on t.v.) 			

Task/Data	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
2. How find site from EPA home page? (Used as a Task Question)	<ul style="list-style-type: none"> Scrolled down page Clicked on "Kids " Found it quickly, although did have to scroll a bit. 	Not present	<ul style="list-style-type: none"> Clicked on "Kids" Site was easy to find. 	<ul style="list-style-type: none"> Clicked on "Kids" Found it quickly and easily. 	<ul style="list-style-type: none"> Did not find the <i>Explorers' Club</i>. Looked in the right column only. 	<ul style="list-style-type: none"> Immediately found the "Kids" link and clicked on it. 	<ul style="list-style-type: none"> Yes, easy to find. Clicked on Kids
3. Other Comments		<ul style="list-style-type: none"> Participant was very quiet and did not talk very much to the observer. 		<ul style="list-style-type: none"> She didn't have many problems with the Web site. She didn't use the "Return to <i>Explorers' Club</i>" frame, but when she visited sites that were missing the frame she seemed to have a harder time finding her way back to the <i>Explorers' Club</i> home page. 		<ul style="list-style-type: none"> Tended to click on the graphics to the left rather than read the available information. 	
Task 1 -Can you find a site about garbage and recycling?							
General Paths Tried							Garbage & Recycling/Recycle City

Task/Data	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Site Found	Superfund ABCs Kid's Adventure Story		Follow that Trail	<ul style="list-style-type: none"> Planet Protectors Club - Coloring Book Superfund Kids - "Kids' Adventure Story" 	<ul style="list-style-type: none"> Planet Protectors Club - Detective Training/Word Search When Greenville turns Brown. 	<ul style="list-style-type: none"> Recycle City 	Recycle City
Did you like it?	Yes, liked both of them. Read the Story and seemed to enjoy it. Also like the pictures.		<ul style="list-style-type: none"> Needs less reading and more interactive activities. Wanted directions on how to make a circle (instructions say to circle certain pictures. This is a pdf file and is intended to be printed out. This was not clear to the participant. 	<ul style="list-style-type: none"> Coloring book did not work, so didn't like that site. Also, she wasn't sure how to get the instructions out of the way of the game. Liked the Kids Adventure Story. Thought it was pretty neat and kind of funny. 	<ul style="list-style-type: none"> Yes 	<ul style="list-style-type: none"> Yes 	"It's cool...It's great"
Does it teach you something about the subject topic?			Yes	Yes		Yes - you should reuse.	"A little - you should recycle."
Would you go back to this site?	Yes		Yes			Maybe	Yes

Task/Data	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
User Attitude	Effortless		Effortless Back button	<ul style="list-style-type: none"> • Annoyed because first site didn't work. • Back button 	<ul style="list-style-type: none"> • Confusion (when tried to circle words in the Word Search) • Back button 		<ul style="list-style-type: none"> • Confusion (clicked on soccer balls instead of site title, and so could not get to site at first) • Back button (clicked several times to go back to home page).
Graphics Comments			Would like more graphics.		They were good.		
Disappointment Comments				<ul style="list-style-type: none"> • Had trouble getting back to the home page. The "Return" frame was missing. Finally clicked on "EPA home" link. 			<ul style="list-style-type: none"> • A little hesitant at first because the soccer ball icons are not links to the sites.
Technical Difficulties				<ul style="list-style-type: none"> • Computer seemed to freeze up at one point. • Coloring Book site did not work (the picture was black and it was not possible to "paint" the picture. 			

Task/Data	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Other Comments	Quickly found her way back to the <i>Explorers' Club</i> home page.					Was careful to read everything, but there was too much to read for the last level.	<ul style="list-style-type: none"> In Recycle City, clicked on the warehouse, hazardous waste center, and other places.
Task Completed?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Task 2 - Find a site that tells you about plants and animals.							
Paths Tried				Plants & Animals/Save our Species		Plants & Animals. Went to Chesapeake Bay site first.	
Can you find the beetle?	Yes, very quickly.		Yes	<ul style="list-style-type: none"> She preferred to look at the plants and animals that were of more interest to her. 	Yes	Yes, immediately.	First no, but then found it.
Do you like this site?	"It is interesting and easy to understand"		<ul style="list-style-type: none"> I don't like bugs. Liked the Chesapeake Bay site better. It has more colors, is more kid friendly, and has more information and pictures. It needs some games. 	<ul style="list-style-type: none"> It is pretty neat But would like more information. 	Yes		Yes

Task/Data	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Does it contain interesting information?	She seemed to enjoy the site.			Yes, but would like more detailed information and some games and activities in addition to the facts.	Yes, it would be good for a report.	Yes, but he didn't understand that the site was about endangered plants and animals.	"Uh-huh"
Would you go to the site on your own?	Yes.			<ul style="list-style-type: none"> • Maybe to see some of the animals, but probably wouldn't go back a lot. • Got bored with the site and checked out the Chesapeake Bay site. 	Yes, if he knew about it.		
User Attitude	<ul style="list-style-type: none"> • Effortless • Back button 	<ul style="list-style-type: none"> • Frustrated • Confusion • Got lost 	<ul style="list-style-type: none"> • Effortless • Back button 	<ul style="list-style-type: none"> • Effortless • Back button • Search tool (on the Chesapeake Bay site) 	<ul style="list-style-type: none"> • Back button (used this for everything) 	<ul style="list-style-type: none"> • Effortless • Back button 	<ul style="list-style-type: none"> • Frustrated • Back button
Graphic s Comments	<ul style="list-style-type: none"> • Enjoyed the plant and animal pictures. 		<ul style="list-style-type: none"> • Would like more animated pictures (and fewer "real" pictures.) 				Too much clicking to the right to read the tags on "Save our Species"

Task/Data	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Disappointment Comments					<ul style="list-style-type: none"> Site would be improved if names were added underneath the pictures of each plant and animal. 		
Technical Difficulties		<ul style="list-style-type: none"> Ad appeared on Games/Detective Training Error on Learning_Zone 					
Other Comments	Participant wrote down the EPA web address.					Slow but persistent reader.	
Task Completed?	Yes	No	Yes	Yes	Yes	Yes	Yes
Task 3: Find a site that describes science experiments.							
Paths Tried		<ul style="list-style-type: none"> Got to a chipmunk site. 		<ul style="list-style-type: none"> Science/Darby Duck/Critter Scope Also Science/A Kids Adventure Story Also Science/Trail of the Missing Ozone 		Science/Darby Duck/Speedboats	

Task/Data	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Can you find a fun experiment?	Yes. The word “experiment” is not in the heading, so the child had to read the sub text to each link.	No	Yes	Yes	Yes	Yes	Yes
What did you choose?	Superfund experiment		<ul style="list-style-type: none"> • Darby Duck/Shake it up baby. • Darby Duck/Sink or Swim” 	<ul style="list-style-type: none"> • Darby Duck/Critter Scope 	<ul style="list-style-type: none"> • A Kids’ Adventure Story groundwater experiment 	<ul style="list-style-type: none"> • Darby Duck/Speedboats 	
Is it easy or hard to use?	Easy		Easy		Easy - good instructions.	Didn’t really understand that it was an experiment. “Speedboats” is probably too advanced for this participant’s level.	
Are instructions easy to understand?	Easy, the pictures are helpful.		Easy. Particularly likes “Sink or Swim” and spends a lot of time with it.				
What do you like about this experiment?			<ul style="list-style-type: none"> • Easy • Kid friendly 	<ul style="list-style-type: none"> • It looks neat 			
What don’t you like about it?				<ul style="list-style-type: none"> • It looks like something to do at home and she prefers to do projects at school 			

Task/Data	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
What topics or types of experiments would you like to find here?					<ul style="list-style-type: none"> • How to make volcanoes • How to make Gak (from Nickelodeon t.v.) 		
Would you go to this site on your own?	Yes		Yes	Probably	Yes		
User Attitude	<ul style="list-style-type: none"> • Effortless • Back button 	<ul style="list-style-type: none"> • Frustrated • Back button 	<ul style="list-style-type: none"> • Effortless • Back button 	<ul style="list-style-type: none"> • Effortless • Back button 		<ul style="list-style-type: none"> • Effortless • Back button 	<ul style="list-style-type: none"> • Frustrated • Back button
Graphics Comments	<ul style="list-style-type: none"> • Good pictures 						
Disappointment Comments		<ul style="list-style-type: none"> • Found Chipmunk (not an experiment) • Got lost, navigation not clear to her. 					<ul style="list-style-type: none"> • Could not find the Science Room because the print was too small.
Technical Difficulties							

Task/Data	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Other Comments				<ul style="list-style-type: none"> • After looking at the experiment, she went to A Kids' Adventure Story, which she had seen before. She read more of it and went to the end to see if it contained experiment. (She didn't find it) • Also went to Trail of the Missing Ozone and read it carefully. 			<ul style="list-style-type: none"> • Initially said she doesn't like science, but enjoyed the site she found and said now science is okay!
Task Completed?	Yes	No	Yes	Yes	Yes	Yes	Yes
Task 4: Can you find information and a game about air pollution?							
Paths Tried				Air/Global Warming/Scrolled through site/Games/Hangman			
Can you find a game about global warming?	Yes. Participant was initially a bit hesitant about where to find the games.	Yes.	Yes.	Yes.	Yes	Yes	Yes

Task/Data	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
What game did you choose?	Word Search	Hangman	Hangman	Hangman Concentration	Checkers Hangman	Word Search Checkers	<ul style="list-style-type: none"> • Hangman • Word Search
Is the game fun?	Yes! Liked the feature that the word was automatically erased once it was found.	It is okay.	Yes.	<ul style="list-style-type: none"> • Played one round of Hangman. Said it was “pretty fun” and went back to look for a different game. • Liked the Concentration game, and played the whole thing. 	Yes		Yes - liked picking the letters for Hangman. Wanted to “do it again!”
Does it teach you about global warming?	Participant wanted to find out what the “greenhouse effect” is, but this game did not provide an answer.			<ul style="list-style-type: none"> • Yes, she learned through the pictures what activities help and hurt the environment. 	<ul style="list-style-type: none"> • Checkers: “I don’t know...its just checkers.” • Hangman - yes 	<ul style="list-style-type: none"> • Didn’t have time to see if would learn anything about global warming in the checkers game. 	
Does the Global Warming Kids site look interesting?	Yes	It is okay.	It looks cool. It is the best site.	It is the best site so far.	Yes	Loved the floating letters on the Global Warming Kids home page.	Yes
Would you go to this site on your own?	Yeah!		Yes!	Probably.			

Task/Data	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
User Attitude	<ul style="list-style-type: none"> • Effortless 		<ul style="list-style-type: none"> • Effortless • Back button 	<ul style="list-style-type: none"> • Effortless • Back button 	<ul style="list-style-type: none"> • Confusion..at one point just shook mouse • Back button • Distracted by a rubber band. 	<ul style="list-style-type: none"> • Effortless • Back button 	<ul style="list-style-type: none"> • Confusion •
Graphic s Comments						<ul style="list-style-type: none"> • Loved the floating letters. 	
Disappointment Comments	Wanted to know why the greenhouse effect causes problems.						<ul style="list-style-type: none"> • Clicked bullets (icons) instead of words. • For Global Warming Word Search, not all of the words were above the fold of the page (so had to scroll down). • Stopped working after a while due to other people.
Technical Difficulties							<ul style="list-style-type: none"> • Hangman page did not load after the 2nd or 3rd try on the page. • Long wait for pages to load.
Other Comments		<ul style="list-style-type: none"> • Good site • Has a lot of games. 				<ul style="list-style-type: none"> • Really liked the games on this site. 	<ul style="list-style-type: none"> • Had heard of most of the words in the Word Search

Task/Data	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Task Completed?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Task 5: Can you find a site that describes how we pollute the water around us?							
Paths Tried	<ul style="list-style-type: none"> • Clicked on “Water” • Went to first site, but it was a bad link. • “What’s Wrong with this Picture?” 			<ul style="list-style-type: none"> • Clicked on “Water” • Tried all three links. 			
What site did you choose?	What’s Wrong with this Picture?	Did not find a site.	What’s Wrong with this Picture?	<ul style="list-style-type: none"> • Drawing Gallery (bad link) • Water Treatment Path. Understands that it is about how to clean water, and so looks for another site about polluting water. • What’s Wrong with this Picture? 	• What’s Wrong with this Picture?	• What’s Wrong with this Picture?”	• What’s Wrong with this Picture?
Do you like this site?		<ul style="list-style-type: none"> • It is good. • The picture is okay. 		• It is pretty fun.		• Probably	• Yes

Task/Data	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Is it easy to understand and to use?			Yes		Yes	No - needed explanation of the site to understand it.	"Yup!"
Does it contain interesting and helpful information?			Yes!	Yes, it has good information.	Yes		<ul style="list-style-type: none"> It was fun to look for things in the house that were done wrong
Would you go back to this site on your own?	Yes. All the sites are really good.		Yes	Participant was noncommittal about returning to the site.	Yes		
User Attitude	<ul style="list-style-type: none"> Effortless Back button 		Effortless Back button	<ul style="list-style-type: none"> Effortless Back button 	<ul style="list-style-type: none"> Confusion (got lost after clicking on the link) Back button 	<ul style="list-style-type: none"> Effortless Back button 	<ul style="list-style-type: none"> Back button
Graphic s Comments	Good		Would like more animated pictures.		Would be good in color.		<ul style="list-style-type: none"> It was hard for her to visualize the importance of stream erosion.
Disappointment Comments					Disappointed that the site was in black and white.		<ul style="list-style-type: none"> Concerned about picture of watering the street – not clear on the problem being illustrated here. "My Grandma waters things!"

Task/Data	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Technical Difficulties					Pollution Drawing Gallery has bad link.		
Other Comments	<ul style="list-style-type: none"> • Asked what the word “stabilization” means. 					<ul style="list-style-type: none"> • Began to lose interest at this point of the user testing process. 	
Task Completed?	Yes	No	Yes	Yes	Yes	Yes	Yes

FOCUS GROUP QUESTIONS

Question	Responses
Task 6 - What did you think about the games? (Asked in a Focus Group format)	
1. Did you enjoy the games that you played today?	Yes, most of them.
2. What were your favorite games?	<ul style="list-style-type: none"> • Word Search - 2 • What's Wrong with this Picture? - 2 • Checkers - 1 • Hangman and What's Wrong with this Picture?- 1 • Hangman and Checkers - 1
3. Did you learn about the environment from these games?	Yes, except for Checkers.

Question	Responses
4. What suggestions do you have for improving the games or for other games?	<ul style="list-style-type: none"> • A maze. Perhaps there could be a car that is leaking oil and the player must get it to the mechanic. At the end of the game, ask what the player learned. • Chess or Tic-Tac-Toe with trees as game pieces. In the Tic-Tac-Toe game, the player would have to answer questions about the environment in order to earn his/her X or O. • An obstacle course about the environment. • A coloring game of the environment (for example, color in the good/clean parts of the environment and circle what is polluted). • Environmental “trivia” or guessing games, where you type in answers about what is good for the environment. • Puzzles that teach about the environment. • A game where you try to beat an oil company. • Problem-solving games. • Guessing games.
Focus Group/Observer Follow-Up Discussion	
1. Would you come back to the <i>Explorers’ Club</i> on your own?	The kids were very enthusiastic about the <i>Explorers’ Club</i> . They liked the site and would come back again.
2. Why would you come back to this site?	<ul style="list-style-type: none"> • It was fun. • It would be helpful for school reports (for example, about an animal or other topic). • We learned a lot. • It was interesting. • Liked the Club House on the home page. • The games were fun. • Liked the useful information regarding how “I” can help the environment.
3. Is the site easy to use?	<ul style="list-style-type: none"> • Most of the kids agreed that the <i>Explorers’ Club</i> is easy to use, although one or two kids had a little more trouble navigating their way around the site and understanding the sites that they visited.
4. Is the site easy to understand?	<ul style="list-style-type: none"> • Descriptions of each site are generally easy to understand and gave good idea of what was to be found in the site (Check - did some kids have problems?)
5. What did you think about the designs and colors that were used in the site?	<ul style="list-style-type: none"> • Make the home page more colorful. • Use brighter colors, even with the lettering. Don’t just use black and blue for the writing. • The white background could be a different color.

Question	Responses
6. Were there enough graphics?	<ul style="list-style-type: none"> • Would like more graphics. • Add more pictures. • Most kids prefer cartoon pictures instead of realistic pictures. • Some kids want animation.
7. Was there enough written information?	<ul style="list-style-type: none"> • There was a lot of debate over pictures vs. words. Some kids wanted more pictures and less words, while other kids said they like to read and would like to see more words, facts, and information in the site. • One kids suggested a compromise: there should be both more words AND more pictures. • Another kid suggested that there should be facts (like a caption) with each picture. • Other kids suggested that there should be short descriptions (or one-liners) and then users can click on an icon to get more detailed information. • Add Frequently Asked Questions sections.
8. What other improvements would you make to the <i>Explorers' Club</i> ?	<ul style="list-style-type: none"> • Add more sites to the Art Gallery. • More interactive tools

Summary of Focus Group and User Test Results
EPA Explorers' Club Web Site
 Jamestown Elementary School, Arlington, VA (4th Graders)

Task	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Pre-Test Questions							
Grade	4 th	4 th	4 th	4 th	4 th	4 th	4 th
WWW Experience	Advanced	Intermediate	Advanced	Intermediate	Advanced	Intermediate	Advanced
Frequency of Use	> Once/day	Once/day	Once/day (for about ½ hour)	< Once/day	> Once/day	< Once/day	At least once/week
Connect Speed	fast	fast (cable modem)	fast	slow	medium	fast	fast
Used <i>Explorers' Club</i> ?	No	No	No	No	No	No	No
What would you expect to find on site?	<ul style="list-style-type: none"> • Protect environment • Keep forest fires out 	<ul style="list-style-type: none"> • Science things • Environmental stuff 	<ul style="list-style-type: none"> • Laws • Police and fire stations 	<ul style="list-style-type: none"> • Interesting environmental facts, games, quizzes and other information such as polls. 	<ul style="list-style-type: none"> • Quiz • Information about what you eat • Health/smoking • Protecting the environment - like the rain forest. 	<ul style="list-style-type: none"> • Environmental things • Animals • Plants • Games (Didn't have answers until was told what EPA is)	

Task	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Focus Group Questions							
Browser	Netscape	Netscape	Netscape	Netscape	Netscape	Netscape	Netscape
1. If you use the Internet, what information have you looked for?	<ul style="list-style-type: none"> • Sports • Games 	<ul style="list-style-type: none"> • Sports 	<ul style="list-style-type: none"> • Sports • Games • sStes recommended by friends 	<ul style="list-style-type: none"> • Sports • Games 	<ul style="list-style-type: none"> • www.allmath.com (homework site) 		
Have you looked for environmental information?	No		Goes to sites that help with homework and types in key words (e.g., www.allmath.com)	No	No		
How did you begin your Internet search?	NR						
What search engines do you use?	<ul style="list-style-type: none"> • Google • Yahoo!igans (at school) 	<ul style="list-style-type: none"> • Google 	<ul style="list-style-type: none"> • Google 	<ul style="list-style-type: none"> • AOL 	<ul style="list-style-type: none"> • Google • Alta Vista 	<ul style="list-style-type: none"> • Doesn't use (or didn't understand question) 	<ul style="list-style-type: none"> • Yahoo
What search terms do you use?	NR		Type in whatever topic I'm looking for.				

Task	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
2. Can you find the EPA kids' site from the EPA home page? (Treated as a Task Question)	<ul style="list-style-type: none"> • Yes (2nd try - did not click on correct graphic) 	<ul style="list-style-type: none"> • Yes 	<ul style="list-style-type: none"> • Yes. (Scrolled through the site before the question was asked. Looked a little concerned when first heard the question, and then found the "Kids" link. 	<ul style="list-style-type: none"> • Yes, clicked on "Kids" 	<ul style="list-style-type: none"> • Yes • Suggest that "Kids" icon be placed higher in EPA home page so don't have to scroll down. 	<ul style="list-style-type: none"> • Yes 	<ul style="list-style-type: none"> • Yes
Task 1: Can you find a site about garbage and recycling?							
What site?	A Kids Adventure Story (Superfund)	A Kids Adventure Story (Superfund)	Clicked on Garbage & Recycling and looked at Superfund ABCs and Planet Protectors Club	<ul style="list-style-type: none"> • A Kids Adventure Story • When Greenville turned Brown 	Kids Adventure Story	You & Your Environment - Global Warming - Games	You & Your Environment/false start - Garbage & Recycling - Superfund ABCs
Do you like the site?	Yes	Yes	<ul style="list-style-type: none"> • Liked some. • Thought Superfund ABCs is for younger kids. • Not interested in Planet Protectors Club - Case of the Broken Loop. • Liked Planet Protectors Club - Environments but some confusion about how to play the game. 	Yes - liked both. Likes stories because the "beginning captures the reader and you want to find out what happens next."			

Task	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Does it teach you about garbage and recycling?	Participant read the story and learned what Superfund is (and discerned the difference between Superfun and Superfund.)	Yes - but didn't have time to read the whole story.		Yes, teaches kids about pollution and air.		No - played unrelated games from left sidebar.	
Would you go there on your own?	NR	Yes		Yes	Yes		
User attitude		<ul style="list-style-type: none"> • Confusion • Back button 	<ul style="list-style-type: none"> • Confusion (pdf site and Environauts) • Effortless • Back button 	<ul style="list-style-type: none"> • Back button 	<ul style="list-style-type: none"> • Effortless • Back button 		<ul style="list-style-type: none"> • Back button • False start
Graphics	Graphics are good.			Liked pictures and animation.	Add more color to the letters (for example, "Garbage & Recycling" heading should be a color, not white.)		

Task	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Disappointments		<ul style="list-style-type: none"> • Would like music to accompany the site. 	<ul style="list-style-type: none"> • Superfund ABCs - for little kids • Planet Protector - needs descriptions of each game so can chose one that looks interesting. • Follow That Trail - it's a pdf file and was confusing to participant - he thought it was a game, but he couldn't "grab" onto anything with his cursor. • Environauts - need more information on how to play the game. 	<ul style="list-style-type: none"> • Wondered why the "Return to <i>Explorers' Club</i>" button isn't on all pages. • It would be more visible if at the top of the page. 		<ul style="list-style-type: none"> • Hangman could be improved if player gets clues at start of game to help figure out the environmental term. 	<ul style="list-style-type: none"> • Would like sound with games • Why is "B" for "bulldozer?" What does this have to do with the environment?
Other Comments	Music would help bring kids to the site (and/or keep them there longer.)	<ul style="list-style-type: none"> • Liked the "buttons" (i.e., the pointing fingers) 	<ul style="list-style-type: none"> • Spotted the "Return to <i>Explorers' Club</i>" frame when trying to return home after computer froze. 		<ul style="list-style-type: none"> • Suggested adding "moral" to the story about Mr. Drumleaky (When Greenville Turned Brown). 		
Technical difficulties			<ul style="list-style-type: none"> • Computer locked up. 				

Task	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Task Completed?	Yes	Yes	Yes	Yes	Yes	NO??	Yes
Task 2: Find a site that tells you about plants and animals							
Can you find the beetle?	No (but did find and look over the site)	Yes	Yes	Yes	Yes	Yes	Yes
Do you like this site?	Yes but also went to When Greenville Turned Brown and liked this story site better.	Yes	Yes	Yes	Yes	Yes	Yes
Does it contain interesting information?		Yes, it would be helpful and was interesting because it is about animals.	Yes, it is interesting and at his grade level.	Yes, thought it was useful and interesting to learn about the disappearance of plants and animal species.	Yes.	Yes	Yes, good information
Would you go to this site on your own?			Yes	Yes			
User Attitude	Effortless Back button	Back button	Effortless		<ul style="list-style-type: none"> • Effortless • Back button 	<ul style="list-style-type: none"> • Effortless • Back button 	<ul style="list-style-type: none"> • Effortless • Back button
Graphics	Liked the java script, movement, and animation of When Greenville Turned Brown	The font could be a little bigger and clearer.		<ul style="list-style-type: none"> • Liked the pictures of animals • Needs more animation 	<ul style="list-style-type: none"> • Letters on Save our Species site are fuzzy and a little difficult to read. • Could use more animation. 		

Task	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Disappointments				<ul style="list-style-type: none"> The SOS site needs bolder print. The pages are hard to read. Could also use more information on each species, including scientific names. 			
Other Comments			Also looked at Plants and Animals of the Chesapeake Bay. It could use more games. It has a lot of information and would be useful for homework, but he wouldn't go there on his own.	<ul style="list-style-type: none"> Looked at quite a few of the sections on plants and animals. Looked at both sites. Liked the pictures for use in reports. 		<ul style="list-style-type: none"> Should give animal/plant's scientific name Should give information about the juvenile of each species. Also went to Plants & Animals of the Chesapeake Bay 	<ul style="list-style-type: none"> Also went to Plants and Animals of the Chesapeake Bay
Technical Difficulties							
Task Completed?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Task 3: Find a site that describes science experiments							
What experiment did you choose?	Darby Duck	Kids Adventure - Superfund	Science Room to Darby Duck	Science Room - Darby Duck - Exploding Colors/Critter Scope/Oil & Water	Darby Duck	Went to On the Trail of the Missing Ozone	Kids Adventure - Superfund
Is the site easy or hard to use?	Easy	Easy	Easy	Easy	Easy		

Task	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Are the instructions easy or complicated?		Easy	Clear	Easy	Easy		
What do you like or dislike about this experiment?		It is representative, so it is easy to tell what happens.	<ul style="list-style-type: none"> • Didn't think any experiment looked interesting. • The Superfund Kids Adventure looked interesting. 	<ul style="list-style-type: none"> • Liked the experiment with colors and wants to try it at home. • Liked the explanation of the oil and water experiment - it described why it happens. 	<ul style="list-style-type: none"> • Like putting food color in things. 		<ul style="list-style-type: none"> • Liked the "So What Did We Learn?" section at the end of the experiment.
What types of experiments would you like to find here?		None	Would like to see different kinds of experiments than currently exist, but doesn't know how he'd change them.	Not sure	Observe pollution in a lake.		
Would you go to this site on your own?		Not unless I had a science experiment I had to do at school.		Yes	Yes, have used other sites with experiments.		
User attitude	Effortless Back button				Effortless	Confusion	Effortless
Graphics	Good				Add more water under Darby Duck		

Task	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Disappointments	None					<ul style="list-style-type: none"> Add color to the Ozone comics Had trouble starting the story. Had trouble pronouncing some of the words. 	
Other comments	<ul style="list-style-type: none"> At some point during the testing, he read about ozone but couldn't find a definition for it. Would like to find out what the definition of "ozone" is. 		<ul style="list-style-type: none"> Keeps running across the Superfund ABCs game. Maybe it is in too many places. 			<ul style="list-style-type: none"> Didn't notice the "Return to <i>Explorers' Club</i>" frame at first, but then did find it and use it. 	
Technical difficulties							
Task completed?	Yes	Yes	Yes	Yes	Yes	No	Yes
Task 4: Please find the definition of the term "global warming." After you find the answer, take a look at the site and comment on it.							
Did you find the definition?		Yes, "An increase in world temperature, which can affect rainfall."	Yes - You & Your Environment - Global Warming - What it is.	Yes - "Earth getting hotter/CO2 trapped in the atmosphere."	Yes (very quickly) - "The rising temperature of the earth."	Yes	Yes
What game or other sections did you choose?		Word Search	Checkers Hangman	Concentration	Hangman Checkers Word Search	Checkers Hangman	Checkers Hangman

Task	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Was it fun?		Yes		Yes			
Will it teach you about global warming?		Probably	Seemed pretty easy to understand.	No			
Is the overall site interesting?		Yes		NR		It was interesting and explained what global warming is. Good information.	It was interesting and explained what global warming is. Good information.
Would you go to this site on your own sometime?		Yes		Yes	Yes		
User attitude	Effortless	<ul style="list-style-type: none"> • Annoyed (about scrolling up and down in the Word Search game) • Back button 		<ul style="list-style-type: none"> • Confusion 	<ul style="list-style-type: none"> • Effortless 		
Graphics					<ul style="list-style-type: none"> • Make the checkers board white and black. Add a sound when one player “jumps” another player. 		

Task	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Disappointments	<ul style="list-style-type: none"> Had to look in “Air” section rather than “In your Environment.” This seemed illogical. Put definition of games up front. Didn’t like scrolling in the Word Search game. 	<ul style="list-style-type: none"> Needs more words and more challenging words. Does not like to have to scroll while playing the Word Search game. 	<ul style="list-style-type: none"> Had trouble getting the checkers game started. 	<ul style="list-style-type: none"> Need more/clearer directions for Concentration game. Doesn’t like to scroll in order to see the entire game - perhaps should make the squares smaller. The icon to get to games is confusing. It should be separate and shouldn’t switch from saying games to climate - air. 	<ul style="list-style-type: none"> Hangman needs directions. It is not clear how to play. Word Search needs more challenges, more words 	<ul style="list-style-type: none"> Couldn’t start Hangman 	<ul style="list-style-type: none"> Couldn’t start Hangman
Other comments		<ul style="list-style-type: none"> No problem circling the words. 	<ul style="list-style-type: none"> Global Warming explanation was pretty easy to understand. 			Liked the trailing words when use mouse on GW Kids home page.	
Technical Difficulties	none						
Task completed?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Task 5: Look for a story about the superfund. Can you find out how waste pollutes our waters?							
What site did you choose?	A Kids’ Adventure Story??	“What’s Wrong with this Picture?”	You & Your Environment - What’s Wrong with this Picture?	Garbage & Recycling - ABCs of Superfund - Kids Adventure Story	<ul style="list-style-type: none"> Superfund - Kids Adventure Story Water Treatment Path 	Water - Pollution Drawing Gallery - Water Treatment Path	What’s Wrong with this Picture?

Task	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Is it easy to understand?	Yes, story is good, likes cartoon pictures.	Yes.	Yes	Yes	Yes - likes the flow of the water path.		
Is in interesting and helpful?	Yes, but the concept of Superfund is confusing.	Yes	Yes, learned about the environment and what activities can pollute the environment.	Yes - tells about what Superfund is, how environment becomes polluted, and how to clean it up.			
Would you go to this site on your own?	Yes, the stories and games are okay and scrolling is not needed.	Yes		Yes, and would tell family and friends about it.			
User attitude	<ul style="list-style-type: none"> • Confusion about concept of superfund, but not the site itself. • Back button 		<ul style="list-style-type: none"> • Confusion - finding a site specifically about Superfund. (Wasn't sure which topic heading to try.) 	<ul style="list-style-type: none"> • Back button 	<ul style="list-style-type: none"> • Confusion (a bit) • Back button 	<ul style="list-style-type: none"> • Confusion • False start 	<ul style="list-style-type: none"> • Back button
Graphics	Likes cartoon pictures			Likes the cartoon format instead of plain text.			
Disappointments	<ul style="list-style-type: none"> • Confused about Superfund 					<ul style="list-style-type: none"> • Couldn't find information about Superfund • Would be easier if knew what Superfund is. • Kept opening frame over frame. 	<ul style="list-style-type: none"> • Took a long time to find the site.

Task	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Other Comments							
Technical difficulties		<ul style="list-style-type: none"> • Art Room/Pollution Art Gallery did not load. 					
Task completed?	Yes	Partial (the site isn't about superfund, but does explain how water gets polluted.)	Partial (the site isn't about superfund, but does explain how water gets polluted.)	Yes	Yes	No	Partial (the site isn't about superfund, but does explain how water gets polluted.)

Focus Group/Observer Follow-up Discussion

Question	Responses
1. Would you come back to the <i>Explorers' Club</i> on your own?	<ul style="list-style-type: none"> • Yes - all the kids agreed that they would come back to this site on their own.
2. Why would you come back to this site?	<ul style="list-style-type: none"> • Liked the games. • Liked the stories. • Liked the coloring pages (other kids thought these were better for younger kids). • Thought "When Greenville Turned Brown" was cool. • Good site for information on math and science and global warming. • Useful for school homework and projects.
3. Is the site easy to use?	<ul style="list-style-type: none"> • Yes • Some kids did not immediately understand that the pictures and labels on the home page were links. Use conventional link (underline or put in blue).
4. Is the <i>Explorers' Club</i> fun to use?	<ul style="list-style-type: none"> • Yes
5. Is the site easy to understand?	<ul style="list-style-type: none"> • Most of the sites were very easy to use, although a few were hard. • It was difficult to find superfund information from the <i>Explorers' Club</i> home page, especially if you didn't know what Superfund is. Part of the problem was the phrasing of the Superfund question, which emphasized water rather than waste. • Need clearer definitions of terms such as superfund, global warming, and ozone (both on <i>Explorers' Club</i> site and linked sites). • Some of the linked sites needed better explanations of how they can be used (e.g., Darby Duck??)
6. Did you usually feel as if you knew where you were in the site or did you feel lost a lot of the time?	<ul style="list-style-type: none"> • Most kids did not see the "Return to <i>Explorers' Club</i>" frame. Those who did find it still thought that it is hard to spot. They suggested we either move it to the top of the page or make it larger. • The "Return" frame is missing from some sites and pages, which is confusing. • Kids still use back button much more often than the "Return" frame. Need to make it even more visible?
7. What did you think about the designs and colors that were used in the site?	<ul style="list-style-type: none"> • Need more colors, especially on the black and white sites (e.g., "What's Wrong with this Picture?") • Titles/headings should be in color (not white)

Question	Responses
8. Were there enough graphics?	<ul style="list-style-type: none"> • Would like more graphics • More photos – for example, photos of animals or to illustrate pollution. • More animation, including using animation to illustrate functions. For example, a animated person picking up trash and putting it in trash can could be used to illustrate the “Garbage and Recycling” icon on the home page. • More comics.
9. Was there enough written information — or too many words?	<ul style="list-style-type: none"> • There were not too many words. • Some sites could use more details and information. For example, the “Save Our Species” site could use more facts about animals (including scientific names and information about the juvenile of each species). • Sometimes key definitions were not very clear. For example, the definition of “global warming” in the Global Warming Kids site, and the definition of “Superfund.”
10. What suggestions do you have for improving the games?	<ul style="list-style-type: none"> • Sometimes it is hard to differentiate between sites that are (or contain games) and those that look like games but aren’t. For example, Planet Protector site contains pdf files (e.g., “Follow That Trail”) that look like games but cannot be manipulated because they’re pdf files. These sites should be more clear about what they are providing. • Many kids liked Hangman, but couldn’t figure out how to start the game. Needs instructions. • Concentration game also needs better instructions. • One kid had trouble getting started on Environauts - it was confusing. • The kids liked Checkers, but realized that it does not provide any environmental information. They suggest that the player should have to correctly answer a question about the environment in order to move his/her checker. • Some kids experienced difficulties playing checkers (in one case the game was over and user couldn’t get it back to starting position; another kid couldn’t take the computer’s pieces after he jumped a checker.) • In Global Warming Kids site, the icon that links the user to the games is confusing - not sure where to click, and can easily end up at the links section.
11. What suggestions do you have for new games that could be added to the <i>Explorers’ Club</i> ?	<ul style="list-style-type: none"> • One student mentioned that his father has designed a game entitled “Save the Earth,” which is like hangman but a piece of the earth is devoured each time the player selects a wrong letter (www.clayberg.com). • Kids also suggested that the Hangman game provide an environmental clue for choosing the correct letters. • Add a worksheet or set of questions that the user could answer as s/he goes through the site. • Add spaceship games.
12. What other improvements would you make to the <i>Explorers’ Club</i> ?	<ul style="list-style-type: none"> • Some of the words are blurry and hard to read (for example, in the “Save Our Planet” web site. • Need a better definition of “Superfund.” • Add sound to the home page and linked sites. • Add more math and science experiments. • Add a worksheet or set of questions that the user could answer as s/he goes through the site.

Question	Responses
13. What improvements would you make specifically to the <i>Explorers' Club</i> home page?	<ul style="list-style-type: none">• Add sound and/or music• Add animation and use it to illustrate functions. For example, animated person picking up trash and putting it in trash can could be used to illustrate the “Garbage and Recycling” icon on the home page.• It wasn't clear to all participants that the pictures are links to the rest of the site. Make the labels visible links, using standard Internet protocol.• Add a suggestions form (is there one already?)

APPENDIX 3

**EPA ENVIRONMENTAL EDUCATION WEB SITES
USER TEST SITE INFORMATION**

**EPA Environmental Education Web Sites
User Testing Locations, Target Audience, and Site Contacts**

Testing Location	EPA Web Site Tested	Target Audience	No. Tested	School Name and Address	School Principal	Main Contact
Arlington, VA	<ul style="list-style-type: none"> • Explorers' Club 	<ul style="list-style-type: none"> • 4th Grade 	<ul style="list-style-type: none"> • 7 	Jamestown Elementary School	Ms. Laura Annan	<ul style="list-style-type: none"> Ms. Laila Gore Ms. Janet Hudgens
Chicago, IL	<ul style="list-style-type: none"> • Student Center • Environmental Education Center 	<ul style="list-style-type: none"> • 7th-8th Grade • Teachers (4th, 7th, 8th grades and computer) 	<ul style="list-style-type: none"> • 6 • 5 	Sandoval Elementary School 5534 S. St. Louis Avenue Chicago, IL 60629	Mrs. Anna Garcia-Berlanga	Ms. Marlene Woytonik
Falls Church, VA	<ul style="list-style-type: none"> • Explorers' Club 	<ul style="list-style-type: none"> • 3rd Grade 	<ul style="list-style-type: none"> • 7 	Thomas Jefferson Elementary School	Mr. Greg Alexiou	Mr. Greg Alexiou
Washington, DC	<ul style="list-style-type: none"> • Student Center • Environmental Education Center 	<ul style="list-style-type: none"> • 10th - 11th Grade • Teachers (High School) 	<ul style="list-style-type: none"> • 5 • 3 	Woodrow Wilson High School 3950 Chesapeake St., NW Washington, DC 20016	Mr. Stephen Tarason	Ms. Andrea Thompson

APPENDIX 4

EXPLORERS' CLUB HOME PAGE

Explorers' Club



Welcome to U.S. EPA's Explorers' Club!

We've filled these pages with lots of fun and interesting things to read and do.

To begin exploring, just click on the picture above.

[HOME](#) [ABOUT THIS PAGE](#) [ASH EPA](#) [STUDENTS & TEACHERS](#)

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